PRELIMINARY ASSESSMENT
PA

AVISON LUMBER CO.
ORD009045261
FIFTH AND LOLA STREET
MOLALLA, OREGON 97038

DECEMBER 24, 1987

Prepared for: U.S. Environmental Protection Agency
Region 10
Superfund Program Management Section
Seattle, Washington 98101

Prepared by: Oregon Department of Environmental
Remedial Action Section
Portland, Oregon 97204-1334

INTRODUCTION

Pursuant to Cooperative Agreement V000332-01, Amendment 2 between the U.S. Department of Environmental Quality (EPA) and the Oregon Department of Environmental Quality (DEQ), the DEQ conducted a Preliminary Assessment (PA) of the site known as Avison Lumber Co.

PAs are intended generally to identify potential hazards at a site, identify sites that require emergency action, and to establish priorities for sites requiring in-depth investigations (Site Inspections). The PA is based on readily available information about the site and is not a full investigation or characterization of the site.

The Avison Lumber Co. PA was conducted to identify potential public health and/or environmental threats related to the site. The PA is based on data derived from the sources listed in "J" below. Information gathered during the PA is summarized in the attached EPA form 2070-12, as Attachment 1.

A. GENERAL SITE DATA

Site Name: Avison Lumber Co.

Location: Fifth and Lola Street
Molalla, Oregon 97038

Owner: Avison Lumber Co.
P.O.Box 419
Molalla, Oregon 97038

Contact: Gordon Haver (Registered Agent)

Telephone: (503) 829-9131

Operator: Same as owner

B. SITE DESCRIPTION

The Avison Lumber Company (Avison) is operating a medium-sized sawmill at the subject site. The site, which is approximately 100 acres, is surrounded to the north and east by residential and commercial property (the town of Molalla) and to the south and west by rural farm and residential property. Bear Creek, a small creek with intermittent summer flows, passes through the site. Maps showing the site location and buildings at the site are in Attachment 2.

C. OWNERSHIP INFORMATION

Avison has owned and operated the subject sawmill since 1956. The mill has operated at this site for approximately 50 years. Avison owns 73 tax lots in Clackamas County. Most of those lots were owned by individuals or other lumber companies prior to purchase by Avison. Six lots were owned previously by Crown-Zellerbach. The activities of Crown-Zellerbach on these lots has not been identified (1).

D. WASTE AND CONTAMINANT TYPES, QUANTITIES AND CHARACTERISTICS

The contaminants present or potentially present at the site are primarily from materials associated with the anti-sapstain treatment process. The materials known to be present at the site include pentachlorophenol (PCP), tetrachlorophenol (TCP), and hexa-, hepta-, and octa-chlorodibenzodioxins (CDDs). The presence of PCP, TCP and CDDs as soil contaminants was identified through several soil sampling efforts of DEQ, EPA and consultants to Avison.

Other potential contaminants are NP-1, a fungicide being used in place of the PCP and TCP, and PCBs from capacitors that were present at the site. Information about NP-1 is presented in Attachment 3. PCB capacitors are known to have been at the site through a manifest form (Attachment 4). The manifest form shows that 23 capacitors were shipped from Avison to Westinghouse in September 1985. Soil sampling by EPA was performed at the site as a part of a routine study of sites where PCB capacitors were known to have been on site. It was not a response to suspected soil contamination. The analyses of the two samples showed no detectable levels of PCBs. No documentation was found on whether or not spills associated with these capacitors occurred.

E. SITE HISTORY AND POTENTIAL PROBLEMS

The mill has been operating in this location since at least the 1950s. Avison started using fungicides to prevent sapstaining approximately 10 years ago when they started to export lumber from the country. A PCP/TCP based solution (Noxtane SS1) with normal working concentrations of approximately 5000 ppm total chlorophenols was used until November 1986 when the treatment solution was changed to NP-1.

Several studies have been performed to assess potential contamination problems resulting from operations at this site. In 1982 a study was initiated after a complaint (Attachment 5) was submitted to DEQ concerning water contamination from the Avison facility. PCP and TCP were found in ditches draining from the facility and in Bear Creek downstream from the facility. A biological survey of Bear Creek suggested suppression of biota downstream from the facility (Attachment 6). DEQ was not able to come to a conclusion as to whether the suppression was due to chlorophenols or runoff and sedimentation of other materials from the facility such as sawdust.

Avison was required to perform a site investigation including ground water, surface water and soil sampling and to upgrade the dripping and spraying operations to best management practices to minimize drippage. Avison is now meeting best management practices as defined by DEQ.

In 1983 DEQ performed sampling of several drinking water wells in the area for PCP and TCP contamination. No PCP or TCP was detected in the well samples.

A site investigation was performed by Beak Consultants for Avison (Attachment 7). Soil contamination was found on site during this investigation. TCP and PCP were both found in one well screened in the shallow aquifer, at concentrations of 61 and 58 μg/l respectively. Some PCP and TCP at concentrations ≤ 4 μg/l was found in four of the wells screened at the intermediate and deeper depths but this was attributed to contamination from the surface during sampling.

In February 1984 DEQ took a series of soil samples at Avison Lumber for PCP/TCP analysis. One soil sample obtained adjacent to an abandoned dip tank showed a concentration of 4980 mg/kg PCP (Attachment 8). Some of the most contaminated soil was removed from the site at the same time that the old dip tanks bottoms were removed from the site. Documentation is not available for the disposal of contaminated soils. The company was verbally advised, not required, to send contaminated soil from around the dip tanks to a hazardous waste management facility. DEQ received verbal confirmation of this activity but did not ask for documentation (2).

Monthly surface water sampling at three stations along Bear Creek performed from December 1983 to January 1987 to monitor PCP and TCP concentrations in the creek is documented in Attachment 9. Surface water sampling was discontinued after January 1987 because the PCP/TCP concentrations had decreased to below the level of concern for a Class 1 stream of 3.2 μg/l. PCP/TCP concentrations in the creek varied in 1986 from not detectable to 19.80 μg/l (SW2 in October 1986). Chlorophenols dropped to not detectable after chlorophenol use was discontinued.

In 1985 EPA performed sampling and analysis of the site for 2,3,7,8-tetrachlorodibenzodioxin (2,3,7,8-TCDD) and hexa-, hepta-, and octa-chlorodibenzodioxins (Attachment 10). 2,3,7,8-TCDD was not detected. Hexa, hepta, and octa dioxin homologues were found. EPA is finalizing a report on this sampling study. Preliminary results of a 2,3,7,8-TCDD equivalency calculation for the homologues, assuming conservatively that all homologue isomers had chlorination in the 2,3,7,8 positions (2,3,7,8 congeners), suggest that one soil sampling point had a concentration above the 1 ppb CDC action level for dioxins in residential areas (3.9 ppb) (3) (Attachment 10). An action level has not been established for industrial areas. Soil and sediment samples obtained at the same time and location for PCP/TCP analysis showed concentrations less than 5 mg/kg except for one

sample with a concentration of 19 mg/kg TCP. These analytical results suggest that degradation of PCP/TCP in soil may have already occurred.

A household health survey for the areas around three lumber mills in Oregon, including the Avison property, was performed by the Oregon Health Division in 1985. The conclusion of the survey was that "no association between living near a lumber mill which uses pentachlorophenol and human or animal health problems was observed" (Attachment 11).

Avison is a small quantity hazardous waste generator. DEQ hazardous waste files document disposal of tetrachlorophenol at CCSI starting in 1985 when Avison applied for a hazardous waste generator permit (Attachment 12). At that time the wastes generated during decommissioning of the dip tanks and excavation of contaminated soil were sent to the hazardous waste management facility in Arlington. Methods of disposal of hazardous wastes, if any, prior to 1982 when DEQ started the investigations at Avison have not been determined. The quantities of hazardous materials generated through those years is likely to have been low as the dip tank bottoms were probably not cleaned and treatment solution was reused as much as possible (2).

F. PHYSICAL AND DEMOGRAPHIC INFORMATION

The town of Molalla is serviced by Molalla's water system. The homes to the south and west of Avison use private wells withdrawing from the deep, confined aquifer. The shallow aquifer under the Avison site feeds into Bear Creek. One well, drawing from the upper aquifer on the other side of the creek from the lumber mill, was identified in 1982 when well water was sampled. This well should not be influenced by any direct contamination from the mill because of its location. However, it may be impacted by contamination from the creek (2). The deeper aquifer does not appear to influence Bear Creek.

The population serviced by private wells in the area is not known but has been estimated to be approximately 100 people. Need informat— for No. of private wells.

G. CONTAMINANT MOBILIZATION, PATHWAYS, AND RISK

Soil sampling at Avison confirmed the presence of soil contamination with PCP, TCP, and dioxin homologues. The surface soil chlorophenol concentrations were typically found to be below 5 mg/kg in the 1985 soil sampling and those concentrations have probably decreased due to degradation. Although exposure to PCP/TCP from contaminated soil is possible at the site, it is unlikely that exposure would be in concentrations of concern.

The initial contamination of Bear Creek was most likely due to surface runoff from the site and migration to the upper aquifer and then to Bear Creek resulting from poor management practices at the site. Although contaminated soil is still present it is unlikely

that migration to the surface water will occur in concentrations of concern. This is especially true since PCP/TCP are no longer being used at the site and Avison has been using best management practices for several years. The PCP/TCP conentrations in the stream decreased to non-detectable after the treatment solution was changed in November 1986. The creek sampling was performed until January 1987.

The groundwater sampling in 1983 identified PCP and TCP contamination in the upper, shallow aquifer. Sampling results of the deeper, confined aquifer suggested that it is unlikely that the deep aquifer which provides drinking water in the area is contaminated as PCP/TCP found in the samples was attributed to contamination from the surface during sampling. Additional sampling has not been performed since the initial sampling.

Samples were taken in 1985 for dioxin analysis along with PCP and TCP analysis. 2,3,7,8-TCDD was not found but other homologues were. Data on health effects related to 2,3,7,8-TCDD exposure has resulted in classification of 2,3,7,8-TCDD as a probable human carcinogen. It is considered to be extremely toxic exhibiting acute, subchronic, and chronic effects in animals and humans. 2,3,7,8-TCDD is not expected to be mobile in the soil environment as it will rapidly adsorb onto organic matter. 2,3,7,8-TCDD at the Avison site would be expected to be found close to the soil surface or in the stream sediment due to surface runoff. The other dioxin homologues have not been found to be as toxic but some do exhibit "2,3,7,8-TCDD like" toxicity particularly 2,3,7,8 congeners (chlorination in the 2,3,7,8 positions). As a way to address risk related to mixtures of CDDs, the toxicity of the homologues is assigned as a percentage of the 2,3,7,8-TCDD toxicity resulting in equivalency factors for various chlorodibenzodioxin congeners (4).

H. PRIORITY ASSESSMENT

This site is considered to be a low priority site for the following reasons:

1. Several studies have already been completed to assess the site showing reduction of PCP/TCP concentrations in the creek and in the soils.

2. Soil contamination with dioxins is suggested although the concentrations found were below the CDC action level of 1 ppb for residential soils in all but one sample. In calculating dioxin concentrations the conservative assumption was made that all the homologues analyzed for were 2,3,7,8 congeners.

3. Ground water sampling results suggesting that PCP/TCP contamination of the aquifer used as a drinking water source has not occurred have not been verified with additional sampling.

4. The facility operated under poor hazardous materials management practices for several years.

I. FOLLOW-UP RECOMMENDATIONS

It is recommended that additional ground water sampling of existing on-site wells be performed to verify earlier results addressing ground water quality. Recommendations from EPA arising from the dioxin sampling study should be obtained. Review of existing data on dioxin contamination should be performed in the context of an industrial site.

J. REFERENCES

1. Clackamas County Tax Collection Property Ownership files
2. Discussion with Jim Broad, DEQ Northwest Region, November 16, 1987
3. Discussion with Larry Patterson, DEQ Water Quality Division, November 6, 1987
4. Chlorinated Dioxins Workgroup Position Document, April 1985. "Interim Risk Assessment Procedures for Mixtures of Chlorinated Dioxins and -Dibenzofurans (CDDs and CDFs)"

OTHER REFERENCES

DEQ files: Hazardous Waste, Water Quality, Northwest Region
EPA files: Dioxin (EPA-000)

ATTACHMENT 1: EPA Form 2070-12 "Preliminary Hazardous Waste Site Preliminary Assessment"

ATTACHMENT 2: Location Map, excerpt from U.S.G.S. 7.5 Minute Series topographic map, Molalla quadrangle, 1954, photorevised 1970, and Site Map

ATTACHMENT 3: NP-1 data: DEQ aquatic toxicity bioassay results dated August 17-21, 1987; NP-1 Material Safety Data Sheet and Product Data Sheet

ATTACHMENT 4: Manifest form, dated September 22, 1985, from Avison to Westinghouse Apparatus Service for PCB capacitors and EPA letter dated June 10, 1985 presenting PCB sampling results

ATTACHMENT 5: DEQ Pollution Complaints, dated April 18, April 22, and June 20, 1980, and subsequent correspondence

ATTACHMENT 6: DEQ Interoffice Memo regarding Avison site study dated October 14, 1982

ATTACHMENT 7: Beak Consultants Incorporated report entitled "Final Report, Chlorophenol Investigation, March-May 1983"

ATTACHMENT 8: DEQ Interoffice Memo dated April 16, 1984 regarding PCP/TCP Degradation at Avison

ATTACHMENT 9: Letter from Scientific Resources Inc. regarding water sampling at Bear Creek from December 1983 to January 1987

ATTACHMENT 10: Letter to Larry Patterson of DEQ from Michael Watson of Region 10 EPA regarding dioxin sampling results dated December 11, 1985 and preliminary calculations of dioxin concentrations for samples obtained in 1985 (PCP/TCP results are also included)

ATTACHMENT 11: Oregon Health Division Study titled "Report of the Findings of a Household Health Survey Conducted in the Molalla/Liberal Area" dated June 15, 1986

ATTACHMENT 12: Notification of Hazardous Waste Activity for Avison Lumber Company and Uniform Hazardous Waste Manifest forms

ATTACHMENT 13: Telephone and meeting memos taken by Deborah Bailey

ATTACHMENT 1

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
OR	D 009045261

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Avison Lumber co.	Seventh and Lola Streets

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Molalla	OR	97308	Clackamas	005	05

09 COORDINATES LATITUDE	LONGITUDE	
45 08 33.0	122 34 23.0	Township 5S Range 2E Sections 8,16,& 17

10 DIRECTIONS TO SITE (Starting from nearest public road)

Intersection of Seventh and Lola streets in Molalla.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)			
Avision Lumber Company	5th & Lola St. (P.O. Box 419)			
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**	
Molalla	OR	97038	(503 829-9131	Gordon Haver Reg. Agent
07 OPERATOR (If known and different from owner)	**08 STREET (Business, mailing, residential)**			
Same as owner				
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**	
			( )	

13 TYPE OF OWNERSHIP (Check one)

☐ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☒ F. OTHER: Corporation (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☒ A. RCRA 3001 DATE RECEIVED: 1/11/85 (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 6/20/85 (MONTH DAY YEAR)

☐ NO Several site visits

BY (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR

☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)

CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)	03 YEARS OF OPERATION		
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN	1956 (BEGINNING YEAR)	present (ENDING YEAR)	☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Known presence of pentachlorophenol , tetrachlorophenol and dioxins from lumber treatment operations.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Known historical surface water contamination. Existing soil contamination. Potential ground water contamination. Original source of contamination has been removed. Some degradation has already occurred.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
Mary Wahl	DEQ			(503) 229-5072
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Debbie Bailey	DEQ	RAS	(503) 229-6811	11/6/87 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
OR	D 009045261

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- [X] A. SOLID
- [ ] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER _____ *(Specify)*
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE
(Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS Unknown
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS *(Check all that apply)*

- [X] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [ ] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [ ] M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE	Unknown		
SOL	SOLVENTS			
PSD	PESTICIDES	Unknown		Soil Contamination
OCC	OTHER ORGANIC CHEMICALS	Unknown		Soil Contamination
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
PSD	Pentachlorophenol /	87-86-5	HWMF after 1985	< 5000	mg/kg
	Tetrachlorophenol	58-90-2	Unknown before 1982		
OCC	Dioxin	999	None	Unknown	
OLW	PCB	1336-36-3	Transport to Manufacturer		

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

DEQ files: Hazardous Waste, Water Quality, Northwest Region
EPA-000 CERCLIS files (Dioxin)
Oregon Health Division Report
Beak consultants "Chorophenol Investigation" March-May 1983

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
OR	D 009045261

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: app. 100
02 [X] OBSERVED (DATE: 4/83)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

Soil contamination from anti-sapstain operations present. One ground water well screened in shallow aquifer showed PCP/TCP contamination. Negative finding for deeper confined aquifer.

01 [X] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: Unknown
02 [X] OBSERVED (DATE: 1983-1987)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

Surface water sampling of Bear Creek documented between 1983 and 1987. Concentrations have decreased since changes in anti-sapstain operations were implemented. Surface water sampling was discontinied in January 1987 after concentrations dropped to not detectable.

01 [X] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: Unknown
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

If contaminated soil in unpaved areas is disturbed, soil particles could be entrained in the air, although this is unlikely in concentrations of concern.

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[ ] POTENTIAL [ ] ALLEGED

No known or suspected.

01 [X] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: Unknown
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

From contaminated soil present on site and potentially from contact with sediments down stream from facility, although this is unlikly in concentrations of concern.

01 [X] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: Unknown (Acres)
02 [ ] OBSERVED (DATE: 1983-1985)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

Known soil contamination with PCP/TCP and dioxins, although the levels are low and degradation of PCP/TCP has occurred. Negative findings in soil sampling for PCBs.

01 [X] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: app. 100
02 [ ] OBSERVED (DATE: 6/16/83)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [X] ALLEGED

Direct cross-connection between mill's water system and chemical makeup system found and corrected. Some anti-sapstain treatment solution may have entered potable water supply. Potential for drinking water contamination from soil contamination. See A above.

01 [X] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: app. 100
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [X] ALLEGED

From contaminated soils present due to anti-sapstain operations. This is unlikely in concentrations of concern. See G above.

01 [X] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: Unknown
02 [ ] OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION
[X] POTENTIAL [ ] ALLEGED

Potential exists as site is not secured, however it is unlikely.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
OR	D 009045261

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) — [X] POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No known damage.

01 [X] K. DAMAGE TO FAUNA — 02 [X] OBSERVED (DATE: 1982) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

A 1982 biological survey suggested suppressed biota in downstream sites although this could be attributed to causes other than chlorophenolics.

01 [X] L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — [X] ALLEGED
04 NARRATIVE DESCRIPTION A lawsuit was filed against Avison in 1981 regarding adverse impacts on livestock present downstream from the site. The suit was settled but settlement terms were not made public. A health division survey found no evidence of adverse effects associated with living in the vicinity of the lumber mill.

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No known or suspected.

01 [X] N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — [X] ALLEGED
04 NARRATIVE DESCRIPTION

See L. above.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No known or suspected.

01 [X] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) — [X] POTENTIAL — ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Waste disposal prior to 1982 not determined.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: Unknown

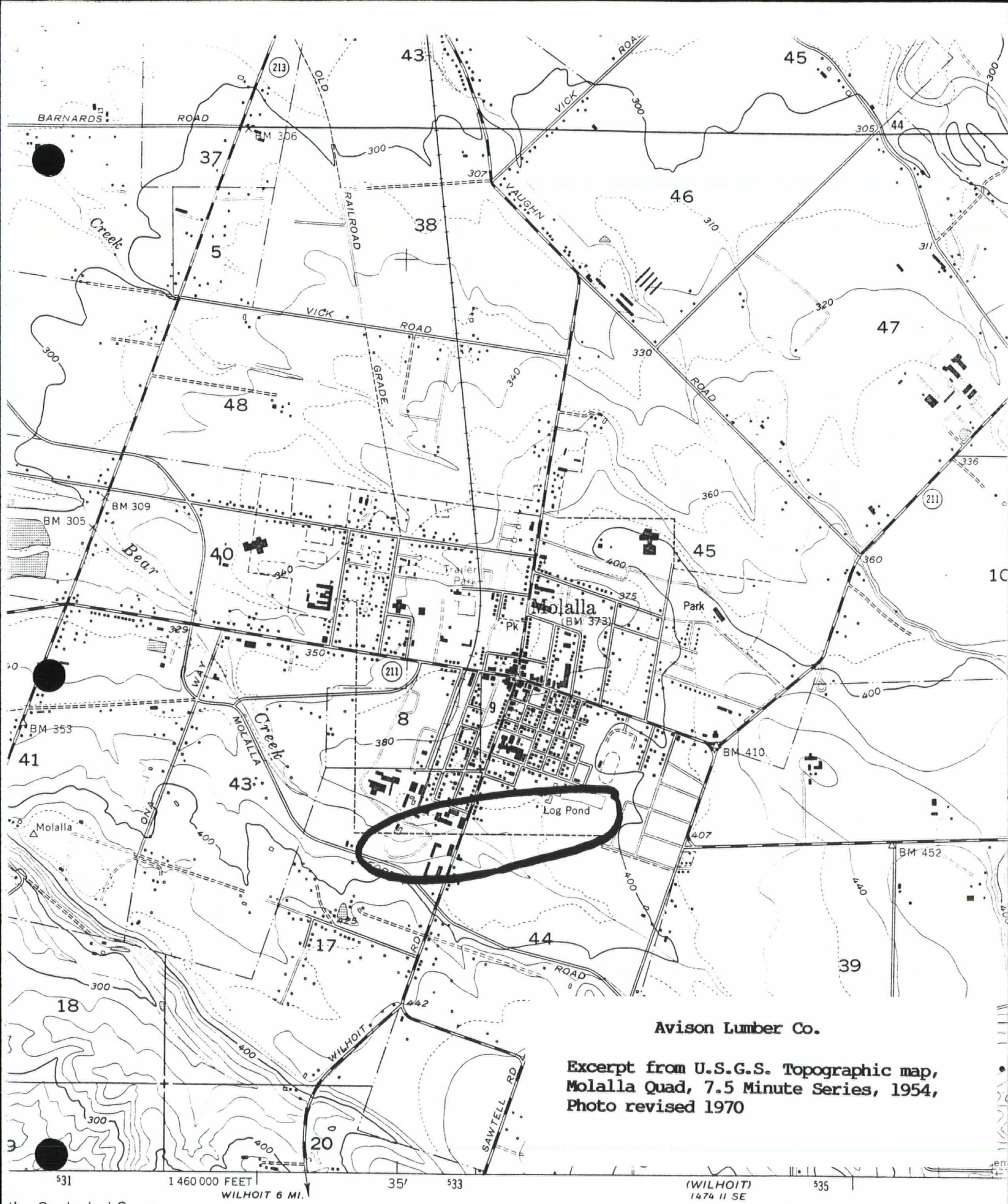
IV. COMMENTS

A significant amount of data is available for this site. Actions have been taken to control the original source of contamination. Soil contamination from past practices remains at the site although at low levels. A site investigation is recommended to confirm earlier results regarding ground water quality and to address dioxin contamination using existing dioxin data.

V. SOURCES OF INFORMATION (Cite specific references, e. g., state files, sample analysis, reports)

Same as VI of part 2.

ATTACHMENT 2



Avison Lumber Co.

Excerpt from U.S.G.S. Topographic map, Molalla Quad, 7.5 Minute Series, 1954, Photo revised 1970

531 1 460 000 FEET 35' 533 (WILHOIT) 535

WILHOIT 6 MI.

1474 II SE

the Geological Survey

gon

otogrammetric methods

ck 1954

an datum

SCALE 1:24 000

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1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

GN MN

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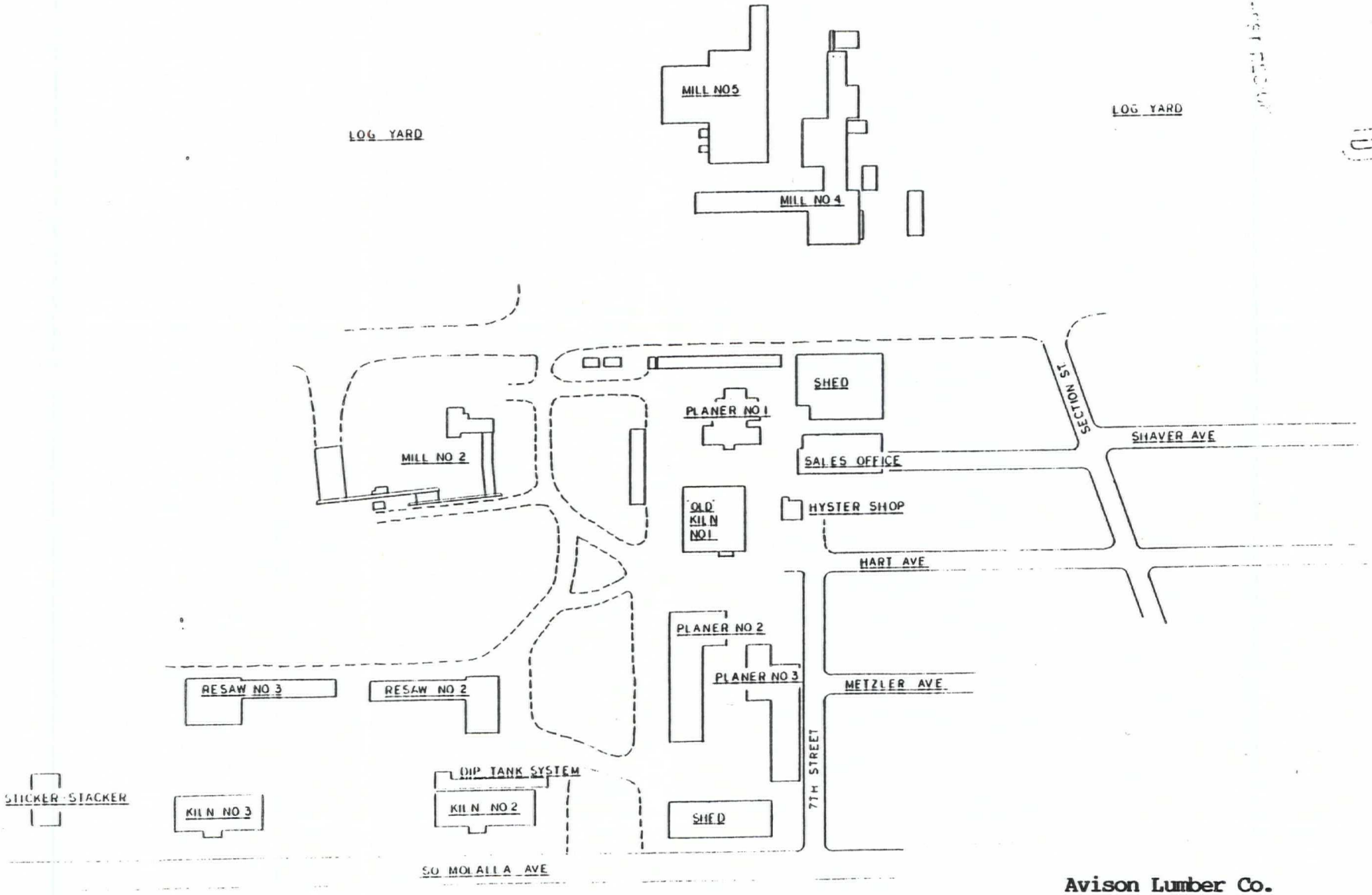


Avison Lumber Co.

Plot Plan

ATTACHMENT 3

PRESERVATIVE DESCRIPTION

NP-1

NP-1 is a microemulsion concentrate containing a unique combination of two effective wood preservatives. The two active ingredients, didecyldimethyl ammonium chloride and 3-Iodo-2 propynyl butylcarbamate, interact synergistically to provide exceptional protection.

Didecyldimethyl ammonium chloride is a disinfectant widely used in hospitals, schools and restaurants. It is also a wood preservative that has been used in pressure treatments to protect wood from decay, beetles, termites and soft rot in service above ground.

3-Iodo-2 propynyl butylcarbamate is a widely used preservative for surface coatings. It is also a wood preservative used to protect wood from mold, mildew, stain, decay and soft rot.

Each preservative provides unique properties that combine in NP-1 to make it an effective treatment for both dry and green wood products.

NP-1 CONCENTRATE PHYSICAL AND CHEMICAL PROPERTIES

Property	Test Method	Test Results
Color	Visual	Amber
Physical state	Visual at 25°C	Microemulsion
Odor	Odor at room temperature	Mild detergent odor
Density, bulk density, or specific gravity	ASTM D941-55 at 25°C	0.9314 g/ml
pH	ASTM E70-74	7.9 for 10%
Flammability - flashpoint	ASTM D3278	104°F *
Storage stability	Stability at 25°C	Stable
Viscosity	ASTM D446-74	145.04 centistokes/sec
Corrosion characteristics	ASTM G1-67	0.1 MPY

* Working dilutions are not combustible until temperatures above 200°F are reached.

*This [illegible] incorrect statement. Label [illegible]evision is pending. NP-1 can be used with unlined steel.

FOR INDUSTRIAL AND EXTERIOR USE ONLY

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling

DILUTE BEFORE USING

Use this product only in lined steel tanks or non-steel tanks*Do not handle this product with unprotected steel equipment Wear synthetic rubber gloves or plastic coated gloves in handling solutions and freshly treated lumber.

For the best results lumber should be anti stain treated immediately after it is sawn A delay in treatment of 24 hours or more permits stain mold and decay growth to start which requires a heavier treatment to achieve control of surface growth Delayed application and log borne infection result in internal stain often under a bright surface.

Freshly dipped or sprayed lumber should be protected from rain washing Dip tanks and drip aprons must be roofed paved and drained to prevent dilution and loss of the anti-stain solution Anti stain treatment concentrations must be geared to achieve protection of the thickest or most valuable item being treated The concentration of the ready-to-use anti stain solution must be adjusted to accommodate seasonal changes in the exposure and species being treated Dip tanks and spray equipment must be properly maintained

MIXING INSTRUCTIONS - Mix one gallon of this product per 200 gallons of water to protect against sapstaining organisms during protracted storage periods If staining should occur, such that product marketability is affected decrease dilution to one gallon of this product per 100 to 200 gallons of water until sapstain control is achieved Lumber and logs should be totally immersed or sprayed so as to insure all surfaces are treated Put about ½ of the water to be used in the mixing tank Add the correct amount of this product and rinse container into the tank. Add the balance of water needed and mix thoroughly In a dipping process, the agitation resulting from the movement of the wood will be sufficient to ensure a good mix On standing unused for a period, re-mix thoroughly before use When using proportioning pumps for mixing, this product should be maintained at temperatures higher than 50 degrees F to prevent inaccurate mixing due to viscosity changes Minor proportioning rate changes can be affected by changing the setting on the pump dial.

NOTE. With normal dip or spray application long term control of decay cannot be achieved This product is intended to provide decay, mold, and blue stain control during storage Such control would not likely extend to the use site

STORAGE AND DISPOSAL

STORAGE Store in a closed, properly labelled container in a cool place. If static generating conditions exist provide necessary grounding and bonding Keep containers closed when not in use

DISPOSAL: Do not contaminate water, food, or feed by storage or disposal Pesticide wastes are acutely hazardous Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance

CONTAINER DISPOSAL: Triple rinse (or equivalent) Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration or, if allowed by state and local authorities, by burning If burned, stay out of smoke

KOPPERS

Sapstain Control Chemical NP-1

SPECIMEN LABEL

Aids in the control of blue stain, mold and decay of freshly cut lumber when properly used. Effective on Douglas fir, White fir, Spruce, Hemlock, the Pines including both the Southern and Western Yellow Pines, Eastern and Western White Pines and many of the hardwoods.

KEEP OUT OF REACH OF CHILDREN.

DANGER ☠ **POISION** ☠

See side panel for first aid and additional precautionary statements.

READ "LIMIT OF WARRANTY AND LIABILITY" BEFORE BUYING OR USING. IF SUCH TERMS ARE NOT ACCEPTABLE, RETURN AT ONCE UNOPENED.

EPA Reg. No. 453-297
EPA Est. 453-MO-1

ACTIVE INGREDIENTS

Didecyl dimethyl Ammonium Chloride ..	64.80%
3-Iodo-2-Propynyl Butyl Carbamate.....	7.60%
INERT INGREDIENTS ...	27.60%
TOTAL	100.00%

LIMIT OF WARRANTY AND LIABILITY

This company warrants that this material conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the directions for use This product is sold subject to the understanding that the buyer assumes all risk of use or handling of this material not in strict accordance with the directions given herewith which are beyond the control of the seller, such as for example incompatibility with other products and the manner of its use of application NO OTHER EXPRESSED OR IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY IS MADE The exclusive remedy of the buyer, and the limit of liability of this company or any other seller for any and all losses, injuries or damages resulting from the use or handling of this product shall be the purchase price paid by the user or buyer for the quantity of this product involved The buyer and all users are deemed to have accepted the terms of this notice which may not be varied by any verbal or written agreement.

SPECIMEN LABEL

Koppers Company, Inc.
Wood Treating Chemicals Dept.
5137 Southwest Avenue, St. Louis, Missouri 63110
314/772-2200

NET CONTENTS U.S. GALLONS

*This is an overst[illegible]ment. Lab revision is pending. As with pesticides, masks must be worn misting conditions occur.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS (AND DOMEST ANIMALS

DANGER

CORROSIVE. CAUSES SKIN BURNS AI IRREVERSIBLE EYE DAMAGE. FATAL INHALED. MAY BE FATAL IF SWALLOWI OR ABSORBED THROUGH THE SKIN.

Do not get in eyes, on skin, or on clothing Wear goggl protective clothing, and rubber gloves when dipping Av prolonged and/or repeated breathing of vapors, mist, substantially saturated atmosphere* Wear a pestic respirator jointly approved by the Mining Enforcement Safety Administration and the National Institute of Occupational Health Use only in well ventilated areas for use or storage in or around the home Keep contain closed when not in use. Do not take internally.

FIRST AID: For skin contact, wash thoroughly with so and water. Remove contaminated clothing and sho Wash clothes before reuse. Get medical attention In c of eye contact, flush immediately with plenty of water at least 15 minutes and get medical attention.

If swallowed: call a physician or Poison Control Cen Drink 1 or 2 glasses of water and induce vomiting touching back of throat with finger. Do not induce vomit or give anything by mouth to an unconscious person.

If inhaled: remove victim to fresh air. If not breathing g artificial respiration, preferably mouth-to-mouth medical attention.

ENVIRONMENTAL HAZARDS:

This product is toxic to fish and wildlife. Do not ap directly to any body of water. Do not contaminate water cleaning of equipment or disposal of wastes.

This product is toxic to domestic animals. Treat sawdust and other wood wastes should be disposed properly and should not come in contact with domes animals or be used as mulch where it will come in cont with useful living plants Care should be taken to preve drip or spray from contacting ornamental shrubs, tre grass and other desirable vegetation.

Vapors may cause injury if adequate ventilation is not sured. Do not use this product indoors, or any other co fined areas, where the vapors may concentrate or migra indoors and cause injury to plant or animal life.

PHYSICAL OR CHEMICAL HAZARDS. COMBUSTIBLE L NOT use, pour, spill or store near heat or open flame.

IN CASE OF FIRE: Use dry chemicals, foam, water fog CO_2. Cool closed containers with water.

EPA 1246 Rev 1

KOPPERS
Chemicals and Coatings

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-005-4)

WHILE THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF, KOPPERS COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

Specialty Wood Chemicals

DATE OF PREP.
2/85, R1 June 1985

Section I — PRODUCT IDENTIFICATION

MANUFACTURER'S NAME
Koppers Company, Inc. Wood Treating Chemicals Dept.

EMERGENCY TELEPHONE NO.
314-772-2200

STREET ADDRESS
5137 Southwest Avenue

CITY, STATE, AND ZIP CODE
St. Louis, MO 63110

MANUFACTURER'S CODE IDENTIFICATION
EPA REg. No. 453-297; FPL 1246

PRODUCT CLASS
Wood Preservative

TRADE NAME
Sapstain Control Chemical NP-1

Section II — HAZARDOUS INGREDIENTS

INGREDIENT	CAS Registry Number	PERCENT	TLV PPM	TLV mg/M³	REMARKS
Didecyl di-methyl Ammonium Chloride					
Quaternary	7173-51-5	64.8			Not established
Ethanol	64-17-5	8.1	1000	1900	
*3-iodo-2 propynyl Butyl Carbamate	55406-53-6	7.6			Not established

*Listed, but not yet recognized as hazardous under Department of Labor definitions.

Section III — PHYSICAL DATA

BOILING RANGE 760 mm Hg	Not determined	FREEZING POINT	$<-20^{o}C$
PERCENT VOLATILE BY VOLUME	25.0%	VAPOR PRESSURE AT 20° C	Water = 1.0 Approx. 1.0
SPECIFIC GRAVITY (H_2O = 1)	0.9314 @ 25°C	EVAPORATION RATE (BUTYL ACETATE = 1)	Slower than ether
VAPOR DENSITY	Heavier than air	SOLUBLE IN WATER - % WT.	87.8%
APPEARANCE AND ODOR	Amber color liquid, weak fatty amine odor		

Section IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) 104°F TCC

FLAMMABLE LIMITS — Lel — Uel

EXTINGUISHING MEDIA
Use Class B type Fire Extinguisher or Extinguishing Agent(s), e.g., water fog, foam, CO_2, and dry chemical.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Water may be used to cool containers. Keep containers tightly closed. Isolate from heat, electrical equipment, sparks & open flame. Closed containers may explode when exposed to extreme heat. Application to hot surfaces requires special precautions. During emergency conditions, over exposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES
Full protective equipment including NIOSH/MSHA approved self-contained breathing apparatus should be used. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion when exposed to extreme heat. DOT Classification - Combustible Liquid.

MATERIAL SAFETY DATA SHEET

Section V — HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Oral LD50 (rat) - 400 mg/kg; Dermal LD50 - 1404 mg/kg.

EFFECTS OF OVEREXPOSURE

Corrosive to eyes & skin. Inhalation of concentrated mist and prolonged or repeated inhalation of mist causes headache, dizziness and in extreme cases may be fatal. Ingestion may cause gastro-intestinal irritation and drowsiness. Ames mutagenicity assay - negative with and without metabolic activation.

EMERGENCY AND FIRST AID PROCEDURES

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water. (Wash clothing before re-use.) Inhalation: Remove to fresh air and call physician; apply artifical respiration if necessary. Ingestion: Drink promptly a large quantity of milk, egg whites, gelatin solutions; or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately. Do not give anything by mouth to an unconscious person.

Section VI — REACTIVITY DATA

STABILITY (Check One)	☐	UNSTABLE	CONDITIONS TO AVOID
	☒	STABLE	

INCOMPATABILITY (materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon dioxide, carbon monoxide, ammonia, nitrous oxides, hydrogen chloride.

HAZARDOUS POLYMERIZATION (Check One)	☐	MAY OCCUR	CONDITIONS TO AVOID
	☒	WILL NOT OCCUR	

Section VII — SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove sources of ignition. (Flame, hot surfaces & electrical, static or frictional sparks.) Confine area of spill. Avoid breathing vapors. Ventilate area. Cover with absorbent material such as Speedi-Dry® processed clay or sand. Place in approved containers for disposal using non-sparking tools.

*Sold by Minerals & Chemical Co., Edison, New Jersey

WASTE DISPOSAL METHOD

Disposal must be carried out in accordance with Federal, State and Local Regulations. Dispose of absorbent materials in a permitted chemical landfill, or incinerate at a permitted facility. Do not incinerate closed containers.

Section VIII — SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) Use appropriate NIOSH/MSHA approved respirator to comply with OSHA 1910.134 if ventilation is inadequate to meet PEL. TC-23C units can be used at concentrations up to 10 times the PEL.

VENTILATION

LOCAL EXHAUST: Sufficient ventilation in volume and pattern be provided to control vapor concentrations below the LEL and TLV in Section II.

MECHANICAL (General): Necessary to supplement local exhaust

OTHER: Remove heavy solvent vapors from lower levels of work areas.

PROTECTIVE GLOVES: Impervious gloves

EYE PROTECTION: Goggles or face shields.

OTHER PROTECTIVE EQUIPMENT: Provide accessible eyebath and safety shower. If clothing contamination and/or skin contact is possible, wear adequate resistant protective clothing.

Section IX — SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Combustible liquid. Store in closed, properly labeled containers in cool place. Keep container away from high temperature areas, sparks, fire or open flame. Keep containers tightly closed when not in use. See OSHA 1910.106 for storage compliance. Do not contaminate food of food stuffs.

OTHER PRECAUTIONS: Do not take internally or get in eyes. Avoid prolonged and/or repeated breathing of mist, vapors, or substantially saturated atmosphere. See OSHA 1910.106 for compliance requirements for combustible liquids. If static generating conditions exist, provide necessary grounding and bonding. Not for use or storage in or around the house or in confined areas where vapors may concentrate. Use only with adequate ventilation, or proper respiratory equipment (See Section VIII.) KEEP OUT OF REACH OF CHILDREN. Do not handle until manufacturers' safety precautions have been read and understood.

Sapstain Control Chemical NP-1

Product Data

Forest Products Group
Koppers Company, Inc.
Pittsburgh, PA 15219
412-227-2000

FOR INDUSTRIAL USE ONLY

General:

Sapstain Control Chemical NP-1 is a chemical concentrate, containing a combination of highly effective fungicides for aiding in the control of sapstain and mold-producing fungi and bacteria that attack, discolor and degrade freshly-sawn lumber.

Product Characteristics:

Description: Clear, heavy, amber, freely pourable solution.

Mixing Instructions: Add about one-third of the water to be used in the mixing tank then add the correct amount of NP-1. Triple rinse the drum and add rinsate to the partially filled mixing tank; add the balance of water needed.

Koppers proportioning pump automatically mixes NP-1 with water in any desired strength. Solution is always consistent for maximum effectiveness.

Use: For lumber 2" or less in thickness use one (1) gallon of NP-1 for every 200 gallons of water used in making up the solution. For thicker stock, or under severe sapstain seasoning conditions use double strength solutions.

Applications: Lumber should be totally immersed or sprayed to insure all surfaces are treated. In spray applications, adequate spray coverage is critical because less solution is applied to the wood by spraying than by dipping.

Large aperture nozzles are desirable, applying five to eight gallons of solution per MBF. Avoid clogging of the spray orifices. In dip tanks designed for individual board dipping care should be taken that all faces are treated by insuring that multiple stacking is prevented.

Delayed applications of NP-1 solutions may permit interior stain. Lumber should be anti-stain treated within 24 hours after cutting. Protect freshly treated lumber from rain washing to avoid run-off or dilution. Cover tanks with a roof to prevent addition of rain water and dilution of the solution.

Clean vats and spray equipment regularly to remove sawdust and other debris.

Packaging:
55 gallon drums and Tote Bins (West Coast)
55 gallon drums (East Coast)

Acceptance:
EPA Reg. No. 453-297
EPA Est. No. 453-MO-1

ACTIVE INGREDIENTS:

Didecyl dimethyl Ammonium Chloride	64.80%
3-Iodo-2-Propynyl Butyl Carbamate	7.60%
INERT INGREDIENTS	27.60%
TOTAL	100.00%

Physical Properties

Boiling Range	Not Applicable
% Volatile by Volume	25%
Specific Gravity	0.93 @ 60 °F
Vapor Density	Heavier than air
Freezing Point	below < – 20 °C
Vapor Pressure @ 20 °C (Water = 1.0)	Approx. 1.0
Evaporation Rate	Slower than ether
Soluble in water	Completely
Appearance and Odor	Amber colored liquid, weak fatty amine odor
Flash Point	104 °F Tag Closed Cup

Storage:

Combustible liquid by DOT definition: DO NOT STORE, USE, POUR OR SPILL NEAR HEAT OR OPEN FLAME. Store in closed, properly labeled containers in a cool place. See OSHA 1910.106 for storage compliance. Stable over normal range of storage temperatures (-0 °F to 90 °F). KEEP OUT OF THE REACH OF CHILDREN. If static generating conditions exist, provide necessary grounding and bonding.

EXPLOSION AND FIRE HAZARD:

Use a dry chemical, foam, CO_2 or water fog spray as extinguishing media. Avoid spreading fire and liquid by water flooding. Closed liquid containers may build up pressure due to heat exposure therefore, water may be used to cool containers. Wear full protective clothing including NIOSH/MSHA approved self-contained breathing apparatus for firefighting.

Chemical Reactivity:

Not applicable to this product. Sapstain Control Chemical NP-1 contains no readily oxidizable or reducible components.

Health Data:

Ventilation: Maintain vapor concentrations below the TLV limit. Use appropriate NIOSH/MSHA approved respirators to comply with OSHA 1910.134 if ventilation is inadequate.

LV:

Ethanol ..... 1000 ppm; 1900 mg/M³

*1984-85 ACGIH

Employee Exposure: Impervious gloves and chemical goggles should be worn. Eye baths and a safety shower should be accessible, and adequate resistant protective clothing should be worn if clothing or skin contact is probable.

Over Exposure: Inhalation of concentrated mist and prolonged or repeated inhalation of mist causes headache, dizziness, and in extreme cases may be fatal.

Emergency First Aid:

Inhalation: Remove to fresh air and call a physician. Apply artificial respiration if necessary.

Ingestion: Call a physician or Poison Control Center. Drink promptly, a large quantity of milk, egg whites, gelatin solutions, or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately. Do not induce vomiting, or give anything by mouth to an unconscious person.

Eye Contact: Immediately flush open eye (held open if necessary) with water for at least 15 minutes and get medical attention.

Skin Contact: Wash off skin immediately. Remove all contaminated clothing and shoes.

Environmental Aspects:

Spill Procedures: Remove sources of ignition. Confine the area of the spill with absorbent materials, clay or sand. Remove contaminated materials to appropriate containers for proper disposal. Federal and State Environmental Protection Agency personnel must be notified in event of a spill or release. Contact local Koppers Specialty Wood Chemicals Division personnel.

Disposal: Product mixtures or rinsate that cannot be reused, contaminated clothing, soils, absorbent compounds used to contain spills, tank residues and other miscellaneous contaminated materials, as well as triple rinsed and crushed containers, should be disposed of according to procedures approved by Federal, State and local authorities. DOT approved containers are recommended.

Hazard: This product is toxic to fish, wildlife and domestic animals. Keep out of any body of water. Do not contaminate water by cleaning of equipment or disposal of wastes. Treated sawdust and other wastes should not come in contact with domestic plants or animals. Care should be taken to prevent drip or spray from contacting ornamental shrubs, trees, grass and other desirable vegetation. Avoid contamination of feed and foodstuffs.

KOPPERS

Chemicals and Coatings

SWC 1246 R00 8503

DEPARTMENT OF ENVIRONMENTAL QUALITY
Request for Analysis

LDP Laboratory No. 87-0845

Location/Site: AVISON-LBR
Date: 6/18/87
Date Received Lab: JUN 18 1987

Collected By: H. DEMARAT
Program: WG 3256I
Date Reported: AUG 28 1987

Purpose: BIO ASSAY
Report Data To:

Comments: JIM BROAD, NW REG. IS COORDINATING TESTING

Basic (P) unpreserved; Nutrient (R) add H_2SO_4 in field; Metals (Tm) HNO_3 added in lab--don't rinse; Organic (X) mason jar lab prepared

Item No.	Sampling Point Description (include time)	*Sample Container (bottle) #'s Nutrients Basic	DO BOD	Metals Organic		Test Required
1	DIP TANK KOPPERS NP-1			X601		BIO-ASSAY
2						
3						
4						
5						
6						

RECEIVED AUG 31 1987 Water Quality Division Dept. of Environmental Quality

Laboratory comments

AQUATIC TOXICITY BIOASSAY

WASTE SOURCE

Laboratory # 87-0515

TYPE OF WASTE: Koppers NP-1 wood preservative

WHERE COLLECTED: Avison Lumber

DATE COLLECTED: June 18, 1987

COLLECTED BY: Harry Demaray

TEST ORGANISM: Daphnia magna

CONTROL: Reconstituted water and Crystal Springs water

SAMPLE LOAD: 250 ppm

TEST DATES: August 17-21, 1987

RESULTS

Sample #	Total # Organisms @ Test Start	Number of Test Organisms Alive After: 24 hr	48 hr	72 hr	96 hr	% Mortality by Concentration
1. 1	10	Ø	Ø	Ø	Ø	100
2. 2	10	Ø	Ø	Ø	Ø	100
3.						
4.						
5.						
CONTROL:	18	18	18	18	18	Ø

REMARKS: All test organisms died within 18 hours of initial exposure to the NP-1 solution.

REPORTED BY: Dennis Ades DRA

REFERENCE:

Peltier, W., and C. Weber, 1985. Methods for Measuring the Acute Toxicity of Effluents to Freshwater & Marine Organisms, 3rd ed., EPA, Cincinnati.

ATTACHMENT 4

HW

FOR HELP IN CHEMICAL EMERGENCIES INVOLVING SPILL, LEAK,
FIRE OR EXPOSURE CALL TOLL-FREE 1-800-424-9300 DAY OR NIGHT

THIS SHIPPING ORDER

must be legibly filled in, in ink, in indelible Pencil, or in Carbon, and retained by the Agent.

Shippers Number

Carriers Number

CARRIER: SCAC

Date 9-22-85

TO: Consignee
Street
Destination Westinghouse Apparatus Service
10831 E. Marginal Way S.
Seattle, WA Zip 98168

FROM: Shipper
Street
Origin Avirson Lumber
Molalla, OR Zip

Route:

Vehicle Number

No. Shipping Units	HM	Kind of Packages, Description of Articles (IF HAZARDOUS MATERIALS - PROPER SHIPPING NAME)	HAZARD CLASS	I.D. Number	WEIGHT (subject to correction)	RATE	LABELS REQUIRED (or exemption)
23	RQ	CAPACITORS Containing Waste, Polychlorinated Biphenyls	ORM-E	UN2315			PC-6/WM-8

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
MAY 5 1986

Remit C.O.D. to:
Address:
City: State: Zip:

COD Amt: $

C.O.D. Fee:
Prepaid ☐
Collect ☐ $

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding $ Per

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
(Signature of Consignor)

FREIGHT CHARGES
☐ PREPAID ☐ COLLECT

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.
Shipper hereby certifies that he is familiar with all the bill of lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

This is to certify that the above-named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. Per

PLACARDS REQUIRED

PLACARDS SUPPLIED ☐ YES ☐ NO-FURNISHED BY CARRIER

DRIVER SIGNATURE:

SHIPPER: Avirson Lumber
PER: J. Ronning
DATE: 9-22-85

CARRIER: WESTINGHOUSE
PER: Tony Robinson
DATE: 9-22-85

FORM # 9-BLS-A (4 PLY)
Revised 11/82

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

FOR HELP IN CHEMICAL EMERGENCIES INVOLVING SPILL, LEAK,
FIRE OR EXPOSURE CALL TOLL-FREE 1-800-424-9300 DAY OR NIGHT

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION X

1200 SIXTH AVENUE

SEATTLE, WASHINGTON 98101

JUN 10 1985

REPLY TO ATTN OF: M/S 524

Dept. of Environmental Quality
RECEIVED
JUN 19 1985
NORTHWEST REGION

RECEIVED
JUN 17 1985
OREGON OPERATIONS OFFICE
EPA-REGION 10

CERTIFIED MAIL

Gordon Haver, Vice President
Avison Lumber Co.
5th & Lola
Molalla, Oregon 97038

Dear Mr. Haver:

This letter concerns the results of an Environmental Protection Agency (EPA) inspection performed April 9, 1985, by Daniel R. Tangarone at Avison Lumber Co. The inspection was carried out to determine compliance with the PCB (polychlorinated biphenyl) Regulations adopted by EPA pursuant to the Toxic Substances Control Act. I understand that, at the conclusion of the inspection, Mr. Tangarone discussed his preliminary findings with Ray Prather of your firm.

As part of this inspection, two samples were obtained. These samples have been analyzed for PCB by the Environmental Protection Agency analytical laboratory. A copy of that lab report is being forwarded to you with this letter. The analysis involved testing of the samples for seven characteristic and distinct types of PCB (Aroclor 1221, 1232, 1242, 1248, 1254, 1260, and 1016). No PCBs were detected in either of the samples (No. 85150710 or No. 85150711.)

With the receipt of this analysis, we have now finished a review of this inspection and are pleased to formally confirm that the inspection did not reveal any violations of the PCB Regulations.

We would, however, like to reiterate, for your benefit, information which Mr. Tangarone provided to Mr. Prather at the time of the inspection regarding the PCB Capacitors in service at your facility. After October 1, 1988, the use of PCB Large High and Low Voltage Capacitors is prohibited unless the capacitors are used within a restricted-access electrical substation or in a contained and restricted-access indoor installation. A restricted-access electrical substation is an outdoor, fenced or walled-in facility that restricts public access and is used in the transmission or distribution of electric power. A contained and restricted-access indoor installation does not have public access and has an adequate roof, walls, and floor to contain any release of PCBs within the indoor location; (Reference: 40 C.F.R. 761.30 (1)(1)).

If you have any questions regarding the inspection or the PCB Regulations, please contact William M. Hedgebeth, EPA Region 10, Pesticides and Toxic Substances Branch, 1200 Sixth Avenue, M/S 524, Seattle, Washington 98101; telephone (206) 442-7369. Thank you for your cooperation.

Sincerely,

Gil Haselberger, Chief
Toxic Substances Section
Pesticides and Toxic Substances Branch

Enclosure

ATTACHMENT 5

Number ________

STATE OF OREGON
DEPARTMENT OF ENVIRONMENTAL QUALITY
Post Office Box 1760
Portland, Oregon 97207

Date Resolved ________

~~CPO~~
~~TPB~~

POLLUTION COMPLAINT

Date: 6-20-80

Time: 9:28

Pollution Type:

- ☐ Air
- ☑ Water
- ☐ Solid Waste/Hazardous Waste
- ☐ Noise
- ☐ ~~Oil~~
- ☐ Subsurface Sewage

Date & Time Observed: lately

Source: Orison Lumber

Location: their plant

Description: they put on an addition to their operations – change channel of stream – stream is turbid (polluted). says water should be checked.

please call

Reported by: Name: (b) (6) [redacted]

Address:

City: ZIP

County: Clack Phone (b) (6) [redacted]

In person ☐ Letter ☐ Phone ☑ Complaint taken by MB

Referred to: (Agency or Person) RHW

Action Taken: I have talked to this person 3 times. AT HIS ~~RES~~ — The stream is not polluted. I have given him all the assistance necessary.

RHW

DEQ/RO-100-10/75

Number ____

STATE OF OREGON
DEPARTMENT OF ENVIRONMENTAL QUALITY
Post Office Box 1760
Portland, Oregon 97207

Date Resolved ____
~~4-22~~
4-23

POLLUTION COMPLAINT

Date: 4-22-80
Time: 3:06

Pollution Type:
- ● Air
- ☐ Noise
- ☒ Water
- ☐ Oil
- ☐ Solid Waste/Hazardous Waste
- ☐ Subsurface Sewage

Date & Time Observed: now

Source: Avison Lumber

Location: Molalla

Description: discharging into ditch - right now

- please call - (call released from Jim Agee in WA)

Reported by: Name: (b) (6)

Address:

City: Clack ZIP

County: Phone (b) (6)

In person ☐ Letter ☐ Phone ☒ Complaint taken by MB

Referred to: (Agency or Person) RHW

Action Taken:

I went out 4/23 & looked at his drainage problem - There was no violation - Contacted (Greg Wilson) of State Water Wgt & showed procedure to him on 4/24 & contacted Jim Tomkoso.

DEQ/RO-100-10/75

umber ______

STATE OF OREGON
DEPARTMENT OF ENVIRONMENTAL QUALITY
Post Office Box 1760
Portland, Oregon 97207

Date Resolved ______
~~SOC~~ TRB

POLLUTION COMPLAINT

Date: 4-18-80
Time: 2:13

Pollution Type:

- ☐ Air
- ☐ Noise
- ☒ Water
- ☐ Oil
- ☐ Solid Waste/Hazardous Waste
- ☐ Subsurface Sewage

Date & Time Observed: All the time

Source: Avison Lumber the new one in Mollala

Location: Mollala

Description: There was a big grain field that they are now filling. There is a natural creek that is now full of oil & debris. They are afraid of what it is doing to their water supply.

If you stop by he would take you there - please phone.

Reported by: Name: (b) (6) [redacted]

Address [redacted]

City: Mollala ZIP ______

County: Clack Phone (b) (6) [redacted]

In person ☐ Letter ☐ Phone ☒ Complaint taken by ______

Referred to: (Agency or Person) RHW

Action Taken: 1 Right C2 [illegible]
Third Drive Way
Gray with Red Door

DEQ/RO-100-10/75

STATE OF OREGON

INTEROFFICE MEMO

RHW

TO: Richard H. Wixom,
Oregon Department of Environmental Quality

DATE: November 18, 1981

FROM: Christopher K. Kirby,
Oregon Department of Agriculture-Plant Division

Chris Kirby

SUBJECT: MOLALLA AREA PENTACHLOROPHENOL SAMPLES

Mr. Tom Harrison, Oregon Department of Agriculture-Plant Division, has requested that I provide you information concerning samples from the Molalla, Oregon area analyzed by this department for pentachlorophenol. I hope that the following information meets your needs:

Date	Location	Description	Analysis
2/19/80	(b) (6) Maxberg Road and Hwy 213 Molalla, Oregon	Domestic Well Water Soil Soil Frozen Hamburger (Whole Tissue) Frozen Chicken (Fat) Frozen Zuchinni	Less than 0.1 ppb No Residue 0.001 ppm 0.01 ppm 0.01 ppm No Residue
2/19/80	(b) (6) Route 2, Box 463 Molalla, Oregon	Domestic Well Water Soil Soil	No Residue Less than 0.001 ppm Less than 0.001 ppm
3/3/80	Publishers Paper Mill Molalla, Oregon	Fiber Filter From Wood Treatment System	7.2 micrograms (Total)
6/25/81	(b) (6) Molalla, Oregon	Domestic Well Water Rhubarb Plants	No Residue No Residue
10/28/81	(b) (6) Molalla, Oregon	Blood From Heifer	0.05 ppm

jjM14B

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY — INTEROFFICE MEMO

TO: JAB and ~~TRB~~ RHW — DATE: October 28, 1981

FROM: R. H. Wixom

SUBJECT: WQ- Avison Lumber - File No. 4580 - Clackamas County

On October 28, 1981, because of an interoffice memo from Ed Quan about Dr. Alford and a dead bovine which had high concentrations of phenol, I tried to locate the owner of the dead animal. This turned out to be (b) (6) who lives off the west highway into Molalla. The entrance is a logging road just past the wood Molalla town sign heading south. This road is adjacent to the large log decking area at Mill No. 4. During the wet season (b) (6) surface drainage way, which runs along the log road, receives rainwater runoff from this logging area. I have made at least two visitations to (b) (6) property on his drainage problem. He has said that Avison's log yard filling changed the drainage down the roadway. There was nothing I could do for him but call in the State Department of Water Resources, and they also couldn't take any action (see complaints). The log road is owned by Crown Zellerbach. (b) (6) also wanted them to pave the road because of the many potholes.

While out trying to find the source, I ran into Mr. John Lowe, attorney, 301 Westside Plaza, 8 N. State Street, Lake Oswego, Oregon, phone 635-4584. Mr. John Lowe has been hired by (b) (6) John stated that (b) (6) says about six bovine have died over a period of time. John had a person with him who was taking pictures of the water and also picked up water and ground samples. I told John about my past calls on (b) (6) and what he had wanted us to do for him. John stated that he was the lawyer in the Crown Zellerbach-Estacada suit and also had clients he was representing against Brazier Lumber of Molalla. I took my water samples at the same place John took his. I feel that the DEQ will be called in on the trial, and we need to know the approximate groundwater movement rate at Brazier Lumber Co.

RHW:o
RO494 (1)

1. Define situation (maps, sources, streams, pop usage areas etc)
2. Identify problems (areas)
3. Determine any sampling needs
4. Identify any necessary control actions

To: Chuck Cantrell JHB

10-21-81

From: (b) (6)

Subject: Phenol in livestock -- Molalla

(b) (6) Veterinarian in Molalla, (b) (6)

called on Oct. 21, 1981, to pass on information he thought the Department would be interested in. He recently cared for an ill cattle that died, so he sent specimens of the animals blood, liver, kidney, and fat to Colorado for analysis. The analysis (he believed of the blood sample) yielded 6.5 ppm of phenols which the lab considered to be significantly high in concentration.

(b) (6) indicated that the farm where the animal came from is toward the West entrance to Molalla up a short ways on

a private logging road- He indicated that the nearest mill in the area is Avison. The owners of the affected animal informed [redacted] (b) (6) that seasonal surface drainage carried phenolic waste to their property- Also their groundwater supply had a sheen and yielded taste and odor. [redacted] (b) (6) did not investigate to substantiate these claims. However, he indicated that several adjoining families initiated a lawsuit against the company.

Note: There is no mailboxes for the homes off the private logging road.

ATTACHMENT 6

WR...
Copy

STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE MEMO

TO: Hal Sawyer

DATE: October 14, 1982

FROM: Northwest Region

SUBJECT: WQ - Avison Lumber - File No. 4580 - Clackamas County
PCP Contamination

Background

Avison Lumber Co. is a medium-sized sawmill located in Molalla. It has 280-300 employees during normal operating periods and produces 100 million BF/yr of lumber of which approximately 25% is treated with a pentachlorophenol preservative.

In response to a complaint concerning water contamination from the Avison facility, the Department conducted a study of the level of phenol, pentachlorophenol and tetrachlorophenol in the waters of the state surrounding the mill. The purpose of the study was to quantify any problem and identify the source if possible. The study was composed of nine sets of water samples, solid waste samples and two biological surveys (copies attached).

Findings

Our study showed that there are three areas of concern. However, the extent of that concern has yet to be determined. The first area is water quality in a small drainage ditch running in front of several homes. Here we found the following ranges of phenols, penta and tetra:

Phenol	0.001 - 0.018 mg/l
Penta	0.004 - 0.095
Tetra	0.001 - 0.090

Most of the samples were in the middle of the range. It is our belief that the penta and tetra come from contaminated debris disposed of throughout Avison's site.

The second area of concern, Bear Creek, runs through Avison's mill site. Stream samples were taken above, through and below the mill. The background levels above the mill were less than 0.001 mg/l for phenols, penta and tetra. The values in Bear Creek below Avison's main dip tank and immediately below the mill had the following ranges:

Phenol	0.003 - 0.014 mg/l*
Penta	0.008 - 0.960
Tetra	0.007 - 0.377

* One phenol level was reported as 0.066 mg/l; however, we question its validity

In Bear Creek at the Molalla STP, approximately one mile below the mill, the ranges were:

Phenol	0.002 - 0.003 mg/l
Penta	0.003 - 0.028
Tetra	0.002 - 0.019

We believe the high levels of penta and tetra in Bear Creek are caused by any or all of the following:

(1) Sloppy operating practices
(2) Contaminated waste from the dipping operation disposed of at the mill site
(3) Accidental or intentional spills of dipping preservative

The third area of concern is groundwater. Because of the high levels in Bear Creek and the sloppy dipping practices, we are concerned that there may be a possibility of groundwater contamination. However, prior to obtaining samples from existing wells in the area or to having Avison drilling test wells, we wanted to get a better feel for acceptable levels and discuss alternative approaches if any.

Conclusion

We believe the high level of penta and tetra in both the drainage ditch and Bear Creek can be attributed to Avison's mill. We also believe that considerable improvement can be made in Bear Creek water quality by requiring Avison to upgrade their dipping equipment and procedures. However, even if these actions are taken, it is very likely that Bear Creek will continue to exhibit levels of penta and tetra in excess of 0.010 mg/l some of the time due to past operating and disposal practices. The levels in the drainage ditch would probably remain unchanged.

Northwest Region's Recommendation

(1) Require Avison Lumber to modify all their dipping and spraying operations to:

(a) Ensure that any spilled preservative is captured,

(b) Minimize preservative loss from treated lumber by increasing drainage time prior to moving lumber to uncontaminated areas, and

(c) Establish a procedure to dispose of contaminated debris and waste preservative in an approved manner.

(2) Require Avison Lumber to drill test wells to determine the extent of impact on groundwater. If Avison is unwilling to assist in a groundwater study, obtain well samples from adjoining property owners.

(3) If contamination of Bear Creek continues at an unacceptable level following the necessary improvements to Avison's lumber treating operation, require Avison to remove contaminated debris or protect Bear Creek by constructing a bypass culvert. Any such culvert would have to satisfy the needs and requirements of Fish & Wildlife.

(4) Leave the drainage ditch issue as a civil matter unless it is determined to have a significant impact on Bear Creek.

RC2CO
Attachments

AVISON LUMBER - BEAR CREEK

PHENOL - PCP - TETRA - STUDY mg/l

Date		10/29/81	12/14/81	12/21/81	1/14/82	2/4/82	2/15/82	3/9/82	3/24/82	5/13/82
STP - MGD		2.4	5.9	26.0	5.9	5.5	13.5	9.0	5.0	0.9
#1. Background Mathias Rd. & Bear Creek	Phenol			<.002	.002					
	PCP		<.001	.001	.002					
	Tetra		<.001	<.001	<.001					
#2. Molalla Avenue & Bear Creek	Phenol			<.002	.003	<.002	<.002			
	PCP		<.001		.002	.006	<.001			<.001
	Tetra		<.001		<.001	.002	<.001			<.002
#3. Cattails along Molalla Avenue	Phenol					<.002				
	PCP					<.001				
	Tetra					<.002				
#4. Second Culvert	Phenol							.002		
	PCP							.001	.002	
	Tetra							.002	.002	
#5. 30' below 2nd Culvert	Phenol									
	PCP								.012	
									.003	
#6. 55' below 2nd Culvert	Phenol									
	PCP								.003	
	Tetra								.002	
#7. 100' below 2nd Culvert	Phenol									
	PCP								.008	
	Tetra								.008	

Date		10/29/81	12/14/81	12/21/81	1/14/81	2/4/82	2/15/82	3/9/82	3/24/82	5/13/82
STP - MGD		2.4	5.9	26.0	5.9	5.5	13.5	9.0	5.0	0.9
#8. Above 3rd Culvert	Phenol									
	PCP								.008	
	Tetra								.007	
#9. Bottom side of 3rd Culvert	Phenol					.007	.003	.066		
	PCP					.28	.019	.033		.21
	Tetra					.182	.01	.018		.111
#10. 100' below 3rd Culvert	Phenol						.002			
	PCP						.014			
	Tetra						.003			
#11. 150' below 3rd Culvert	Phenol						.002			
	PCP						.017			
	Tetra						.009			
#12. 350' below 3rd Culvert	Phenol						<.002			
	PCP						.031			
	Tetra						.015			
#13. Avison Logging Rd. & C-Z Road at Culvert	Phenol	.009		<.002	.009	.014	.004	.005		
	PCP	.96	.018	.013	.16	.58	.018	.024		.89
	Tetra		.009	.006	.10	.377	.013	.017		.421
#14. Avison property fence	Phenol						<.002			
	PCP						.020			
	Tetra						.006			
#15. C-Z Logging Rd. Culvert	Phenol				.004	<.002	.002	<.002		
	PCP		.009		.05	.032	.024	.03		.055
	Tetra		.002		.031	.021	.004	.016		.025
#16. Highway 211	Phenol			.002	.004					
	PCP		.06	.009	.051					
	Tetra		.001	.003	.029					
#17. Molalla STP	Phenol			<.002	.002			.003		
	PCP		.007	.004	.028			<.026	.003	.006
	Tetra		.003	.002	.019			.015	.002	.012

Tile Drain at Behind Dye Tank	85										
#1 Mill Pond Drainage Ditch	36										
#1 Mill Log Road Ditch		.002			.003						
Tyke Mill Pond		.0014			.003						
Corso Logging Road			.65		.076		.012			.005	.001
Logging Road East Pigeon Bear Creek			.006		.027		.017			.035	.002
#1 Mill Livestock Field Drainage					.014		.01			.091	
Drainage out of Back Side of Mill #4 Bear Creek				1.5	.006		.004				
Tile Mill Culvert					.22		.042				
Beaver Mill Drain					.096		.065				
Cattails along Pinella Ave.						.004	.012				
Ground Water into Bear Creek By Chipper						.005	.003				
Under Resaw Dam) Drain Chain along side Dye Tank							.096				
Dripping Liquid in Dye Tank							.065	.002			
Drag Chain Well From Resaw Mill								.001			
Pot Hole									.029		
Drain									.031		
Drainage out of Bank Near Drag Chain										.065	
										.196	
										.010	
										.233	.02
										.020	.04
											.152
											.111
											.65
											.51
											.213
											.16

PURPOSE

To analyze the benthic populations of Bear Creek above, on and below the Avison Lumber Mill site (Molalla) to determine if potential pentachlorophenol runoff is adversely affecting the instream biota.

BACKGROUND DATA

Two previous biological surveys were conducted in April and December of 1976 analyzing Avison's log pond drainage affects on the biota of the receiving stream. (Figure 1). The pond has been completely drained since that survey. Benthic analysis data is shown in Table 1.

METHODS

The biological survey coincided with chemical samples collected at five common sampling sites on February 4, 1982. (Figure 1)

The five sampling sites were:

#1 Bear Creek at (Mathis) Lay Road
#2 Bear Creek at Molalla Avenue
#3 Molalla Avenue roadside ditch next to Avision Mill
#4 Bear Creek at middle of plant property below site #3.
#5 Bear Creek below Avison Mill at culvert under Crown Zellerbach logging road.

Benthic sampling was by kick-net method, all organisms preserved in 70% ethanol and identified as specific as possible.

RESULTS AND DISCUSSION

Stream characterization:

Site 1.

90% rock/cobble, 10% sand/silt bottom
Minimal aquatic vegetation
No visible turbidity
Approximately 1 ft depth
Sample area - 4' wide x 4' in length

Site 2.

Large rocks on mud/silt bottom
Abundant aquatic vegetation
No visible turbidity
Approximately 2 ft depth
Sample area - 4' wide x 4' in length

Site 3.

Slow flowing marsh/wet land roadside ditch
Mud bottom with heavy organic/humic layer
Primary vegetation was emergent cattails
No visible turbidity
Approximately 2 ft depth
Sample area - 4' x 4' sweep of emergent vegetation

Site 4.

Fine gravel/sand bottom with heavy wood chip-sawdust layering
Aquatic vegetation was predominately emergent cattails with submerged pond weeds along banks
Heavy wood dust layers on both emergent and submerged vegetation
No visible turbidity
Approximately 3 ft depth
Sample areas - 3' x 3' bottom strip, sweep of submerged vegetation

Site 5.

80% fine gravel/sand with large rocks on bottom
Minimal vegetation
No visible turbidity
Approximately 1 ft depth
Sample area - 4' wide x 20' in length

Analysis of benthic collections:

Biological study was qualitative in nature with no quantitative calculations being performed.

All organisms found at stations are listed in Table 2.

Site 1.

Three orders of insects (mayflies, stoneflies, caddisflies) that are indicative of good water quality were collected in relatively high numbers

Two types of snails that utilize the living algae covering submerged objects were present in substantial numbers.

Site 2.

Two orders of insects (mayflies, stoneflies) that are good water quality indicator organisms were collected in substantial numbers.

The aquatic sowbug collected is primarily an inhabitant of unpolluted shallows.

Site 3.

No water quality indicator organisms other than aquatic sowbugs were collected at this station.

Freshwater bivalves such as fingernail clams occur in all types of unpolluted habitats.

A change in habitat from fast flowing, clear bottom to the slow flow through masses of aquatic vegetation is the most probable cause in the change of benthic fauna structure.

Site 4.

Heavy wood debris (dust, chips) on stream bed precluded habitation by all organisms except dipteran chironomids; midge naiids that can be found in marginal environments.

All other organisms collected at this station were from sweeps of the submerged vegetation. Of noteworthy interest is that all are classified as climbers, or not found utilizing a stream bed as their habitat.

One species of indicator organism (mayfly) was found at this station, but in very limited numbers. All other species collected here are more pollution tolerant organisms.

Site 5.

Only two species or organisms were collected at this station. Although one was an indicator of good water quality (mayfly), it was found in very limited numbers in a sampling of a large area of the stream bed. The other organism, dipteran midge naiids (chironomids) were found in much high numbers. Chironomids are pollution tolerant organisms.

CONCLUSIONS

The control station (Site 1) had organisms indicative of good water quality in both quality and quantity.

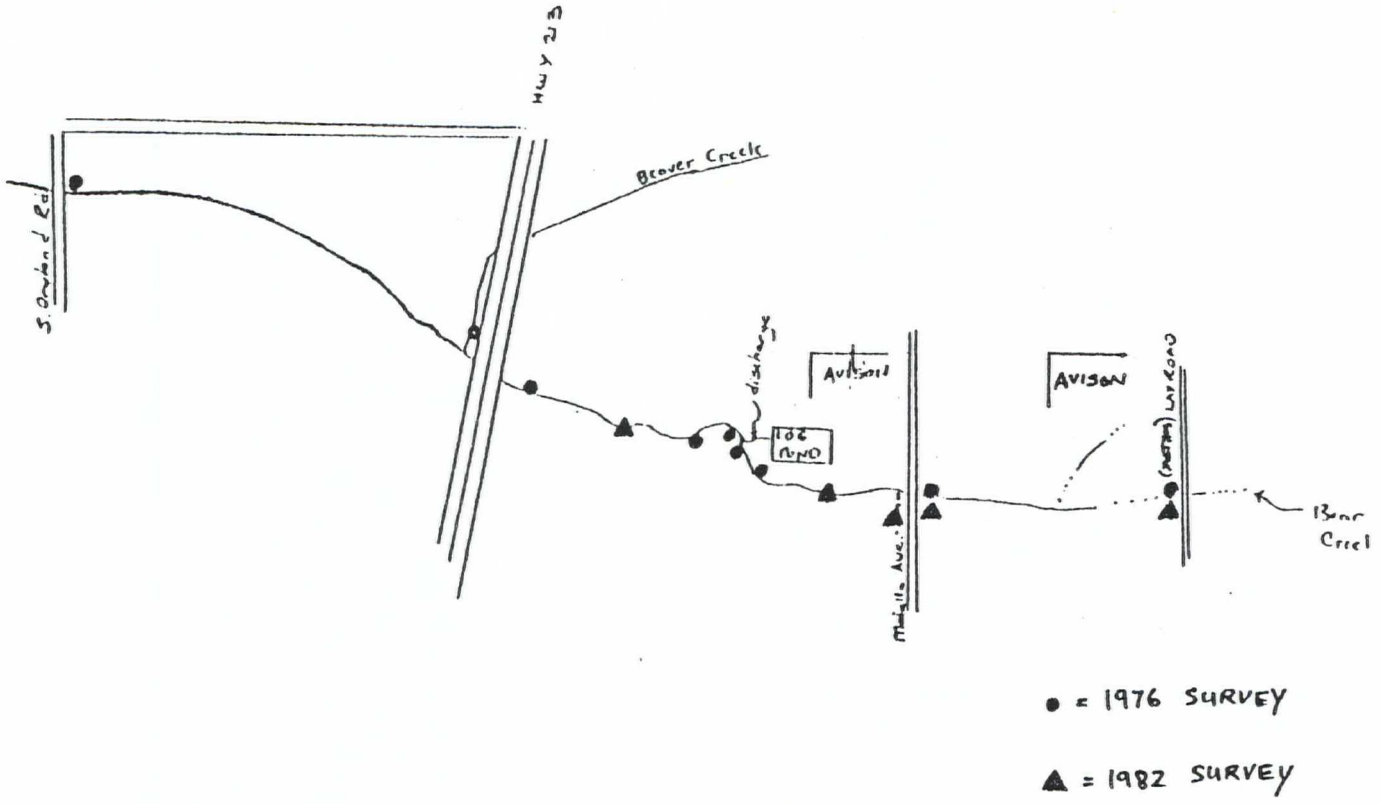
Site 2 is located below the first of the potential PCP sources from the Avison Lumber Complex. Although still indicative of good quality as shown by quality indicator organisms and high numbers, the loss of the snail population from essentially the same type of stream as Site 1 was disturbing. As these snails feed on algae populations growing on submerged objects (vegetation, substrate), there is the potential that this food base is being affected by pollution runoff that is below the threshold concentration that would affect aquatic invertebrates. Further surveys of the periphyton population of that section are suggested.

Site 3 is such a radical change in stream character that valid conclusions cannot be drawn from its benthic analysis.

Site 4 analysis indicated a highly suppressed benthic environment. The bottom substrate proper was practically an ecological desert. The majority of the organisms found were of the climbing type that would not be found inhabiting the stream bed. However, due to the heavy wood debris layering of both the stream bed and submerged/emergent vegetation, conclusions should be withheld as to the cause of the suppression of the biota. It could possibly be due to habitat alteration due to wood debris or toxic effects related to chemicals in the wood debris.

Site 5, although well downstream from the mill property, still indicates a suppressed biota with minimal recovery in both numbers and quality of benthic organisms. Further surveys to determine if and where stream biota recovers are suggested.

FIGURE 1. BEAR CREEK SAMPLE SITES



TABLE

BENTHIC SAMPLES

Group	Order	Family	(Mathis) Lay Road	South Molalla Avenue	Organisms per sq. foot 20' below outfall		200' below outfall	Hwy 213	South Dryland Road
		Date:	12-3	4-6	4-6	12-3	4-6	12-3	
Mayflies	Ephemeroptera	Bactidae	8	14	-	-	-	-	4
Midgeflies	Diptera	Chironomidae	8	6	-	-	40	-	39
Midgeflies	Diptera	Tabanidae	-	1	-	-	-	-	-
Caddisflies	Trichoptera	Hydropsychidae	1	-	-	-	-	-	8
Damselflies	Megaloptera	Sialidae	-	-	-	-	-	-	2
Snails	Pulmonata	Lymnacidae	2	-	-	-	-	-	-
Snails	Pulmonata	Planorbidae	1	-	-	-	-	-	-
Beetles	Coleptera	Dytiscidae	-	2	-	-	-	-	-
Leaches	Rhynchobdellida		1	-	-	-	-	-	-
Worms	Opisthopora	Lumbricidae	1	2	-	-	-	-	-
Worms	Prosopora	Tubificidae	-	-	8	-	-	-	-
Scuds	Amphipoda	Gammaridae	2	3	-	-	-	-	-
		Total	24	28	8	0	40	0	53
		Genera	8	6	1	0	1	0	4

Table 2

BENTHIC ORGANISMS

#1 Bear Creek @ (Mathis) Lay Road

- Annelida (segmented worms)
  - Oligochaeta (freshwater worms)
    - Family Lumbriculidae
  - Hirudinea (leeches)
    - Family Erpobdellidae
      - *Dina anoculata*
- Arthropoda (jointed legs)
  - Insecta
    - Plecoptera (stoneflies)
      - Family Nemouridae
        - *Podmosta* sp.
    - Ephemeroptera (mayflies)
      - Family Baetidae
        - *Baetis* sp.
    - Trichoptera (caddisflies)
      - Family Hydropsychidae
        - *Parapsyche* sp.
      - Family Polycentropodidae
        - *Polycentropus* sp.
    - Coleoptera (beetles)
      - Family Dytiscidae (Predaceous diving beetles)
        - *Hydaticus* sp.
    - Diptera (flies)
      - Family Chironomidae (midges)
- Mollusca
  - Gastropoda (snails, limpets)
    - Family Lymnaeidae (pond snails)
      - *Lymnaea* sp.
    - Family Physidae (pouch snails)
      - *Physa* sp.

#2 Bear Creek @ Molalla Avenue

- Arthropoda
  - Crustacea
    - Isopoda (Aquatic sow bugs)
      - Family Asellidae
        - *Asellus occidentalis*
  - Insecta
    - Plecoptera (stoneflies)
      - Family Nemouridae
        - *Podmosta* sp.
      - Family Taeniopterygidae
        - *Taenionema* sp.
    - Ephemeroptera (mayflies)
      - Family Baetidae
        - *Baetis* sp.

Diptera (flies)
Family Chironomidae (midges)
Family Simuliidae (blackflies)
Simulium sp.

#3 Molalla Avenue Roadside ditch next to Avison Mill

Arthropoda
Crustacea
Amphipoda (scuds, side swimmers)
Family Talitridae
Hyalella azteca
Isopoda (aquatic sow bugs)
Family Asellidae
Asellus occidnetalis

Insecta
Coleoptera (beetles)
Family Dytiscidae (Predaceous diving beetles)
Liodessus sp.
Diptera (flies)
Family Chironomidae (midges)
Family Simuliidae (blackflies)
Twinnia sp.

Mollusca
Pelecypoda (bivalves)
Family Sphaeriidae (fingernail clams)
Sphaerium sp.

#4 Bear Creek on Avison Mill Grounds below Station #3

Arthropoda
Crustacea
Amphipoda (scuds, side swimmers)
Family Talitridae
Hyalella azteca

Insecta
Ephemeroptera (mayflies)
Family Baetidae
Baetis sp.
Odonata (dragonflies, damselflies)
Family Aeshnidae
Anax. sp.
Hemiptera (true bugs)
Family Notonectidae (back swimmers)
Notenecta sp.
Coleoptera (beetles)
Family Dytiscidae (predaceous diving beetles)
Hydaticus sp.
Diptera (flies)
Family Chironomidae (midges)

Mollusca
Gastropoda (snails, limpets)
Family Physidae (pouch snails)
Physa sp.

#5 Bear Creek below Avison @ culvert under Crown Zellerbach logging road

Arthropoda
Insecta
Ephemeroptera (mayflies)
Family Baetidae
Baetis sp.
Diptera (flies)
Family Chironomidae (midge)

ATTACHMENT 7

Final Report
Chlorophenol Investigation
March-May 1983

Prepared for:

Avison Lumber Company
East 5th Street and Lola Avenue
Molalla, Oregon 97038

Prepared by:

Beak Consultants Incorporated
Eighth Floor Loyalty Building
317 Southwest Alder
Portland, Oregon 97204

June 3, 1983
D2938

CERTIFICATION

I certify the ground water hydrology section of this report has been prepared under my direction.

Mackey Smith
Senior Hydrogeologist
Beak Consultants Incorporated

TABLE OF CONTENTS

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1.0 INTRODUCTION

This final report, prepared for Avison Lumber Company, presents information responsive to the Oregon Department of Environmental Quality's (DEQ) interest in determining the extent of chlorophenol contamination of soil and water in the vicinity of the company's plant in Molalla, Oregon. The chlorophenols detected by DEQ in water samples near the Avison plant (Bispham 1983) apparently derived from the application of an anti-stain solution at two dip tanks to lumber intended for export. The anti-stain (fungicide-bacteriocide) solution used at the mills was "Noxtane" containing, according to the Koppers Material Safety Data Sheet, the chlorophenols tetrachlorophenol and pentachlorophenol.

DEQ's request for information from the Avison Lumber Company included in a letter to the company, February 24, 1983, specified the following areas of interest:

- the presence of chlorophenols in ground water;
- the extent of soil and debris contamination in the vicinity of the plant; and
- the potential for further release of chlorophenols from contaminated soils following the installation of the dip tank control facilities.

Beak Consultants Incorporated (BEAK), at the request of Avison Lumber, prepared a Scope of Work to provide DEQ the requested information. This Scope was presented to DEQ March 18, 1983 and approved by DEQ with minor modifications in a letter dated March 21, 1983.

2.0 SCOPE OF WORK

A detailed proposed Scope of Work was provided DEQ March 18, 1983. Tasks in that proposal are summarized below.

2.1 Task 1: Retrieve and Analyze Existing Data

- o Review DEQ sampling data in the vicinity of the Avison facilities;
- o Obtain well logs from wells in the vicinity of the plant to define subsurface geohydrology;
- o Determine areas potentially affected by the anti-stain pollution;
- o Insure compatibility of analytical methodology for analysis of chlorophenols between BEAK and DEQ.

2.2 Task 2: Sample and Analyze Soil Debris and Sediment

- o Obtain samples from upper and lower dip tank areas, treated lumber storage areas, debris sites, log storage areas, and stream bottom sediments;
- o Analyze samples for pentachlorophenol and three isomers of tetrachlorophenol using gas chromatography;
- o Perform a chlorophenol soil leaching test on surface soil samples from three known sites of surface contamination;
- o Prepare a map showing contaminated areas.

2.3 Task 3: Install and Test Monitoring Wells

- o Install five dual completion wells (two or three piezometers in each borehole), three of which will be in a triangular pattern near the lower dip tank, and a single well near each of the two dip tanks;

- o Obtain soil samples from one well by means of a continuous drive sampler;
- o Clean each of the wells and conduct a short duration permeability test;
- o Measure water levels in each piezometer.

2.4 Task 4: Sample Surface and Ground Water

- o Sample water in each of the piezometers;
- o Sample surface water at bi-weekly intervals during April and May;
- o Analyze water samples for penta- and tetrachlorophenols as in Task 2.

2.5 Task 5: Provide Final Report

- o Provide appropriate narrative and graphic descriptions of methodology, results, and recommendations of potential mitigating measures for reducing pentachlorophenol in Bear Creek to less than 0.0032 mg/l;
- o Summarize all data collected during the study.

3.0 SURFACE WATER

3.1 Introduction

Surface drainage in the vicinity of Mills 4 and 5, Resow 2 and the Mill 1 is to Bear Creek either directly or via two small collector ditches (see Sites SWI and SW5 on the aerial photograph, Figure 1). Bear Creek is a tributary of the Pudding River, which in turn enters the Molalla River near its mouth at the Willamette River.

3.2 Methods

Surface water grab samples were obtained using glass sample containers prepared through cleaning and solvent rinsing. Samples were taken March 28 and 29, 1983 at a small drainage ditch (SW1) near the dip tank, three sites along a small drainage ditch north of Mills 4 and 5 (SW4, SW5, and SW6), and at two locations on Bear Creek (SW2 and SW3). Subsequent samples were collected April 25 and May 18 at SW2, SW3 and SW6. A sample was obtained at the outlet of a surface water drainpipe on the south bank of Bear Creek April 25, 1983 (SW8). Samples were placed in ice chests following collection and transported to the laboratory for analysis.

Water samples were extracted and prepared for analysis by FID gas chromatography according to EPA Method 604 (Federal Register 44:69484-69481, 1979). Qualitative and quantitative analysis of sample peaks was by comparison with authentic chlorinated phenol standards. Quality assurance of sample analysis included comparison of results between BEAK and DEQ on split water samples.

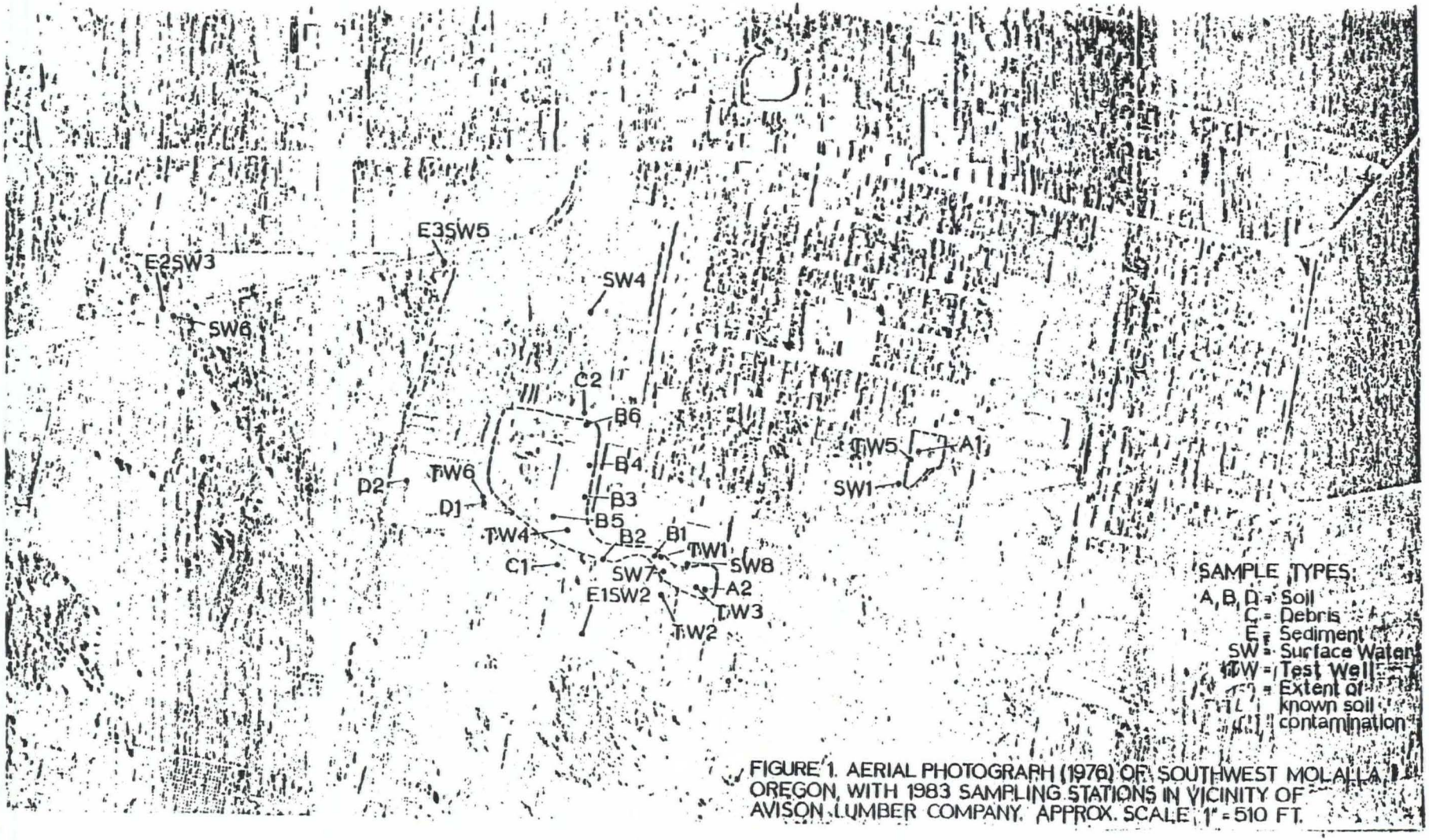


FIGURE 1. AERIAL PHOTOGRAPH (1976) OF SOUTHWEST MOLALLA, OREGON, WITH 1983 SAMPLING STATIONS IN VICINITY OF AVISON LUMBER COMPANY. APPROX. SCALE 1" = 510 FT.

Results of the comparison on a split water sample from Site SW7 on Bear Creek were as follows (g/l [ppb], detection limit 1 g/l, ND = not detectable):

	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
BEAK	ND	811	ND	127
DEQ	ND	860		180

The similarity of these results suggested analytical techniques, though different (DEQ using HPLC instead of FID gas chromatography), were similar in measuring the chlorophenols in water.

3.3 Results

Of the four chlorophenols, pentachlorophenol (PCP) and 2,3,4,6-tetrachlorophenol (TCP) were the primary compounds detected in the samples. On March 28 and 29, water in the ditch flowing from under the treated lumber storage area (see sampling locations W4, W5, and W6 on Figure 1) had four times the concentrations of TCP and PCP than in Bear Creek (locations W2 and W3) (Table 1). The small drainage ditch (W1) from the area in the vicinity of the dip tank at A1 had the highest concentrations of both TCP and PCP. Discharge at the time of sampling was estimated to be 20 cfs in Bear Creek, 1 cfs in the ditch north of the lumber storage yard (W4) and less than 1 cfs in the ditch (W1) near the dip tank at A1.

Samples collected April 25 from Bear Creek, Stations W2 and W3, had higher concentrations of TCP and PCP than the March samples while levels in the small drainage ditch decreased relative to Bear Creek (Table 1). Estimated discharge

Table 1. Concentration of tetrachlorophenols (TCP) and pentachlorophenol (PCP) in water samples from March 28 and 29, April 25, and May 18, 1983 (see photo, Figure 1, for sample locations).

		Concentrations (µg/l)			
Sample Location	Sampling Date	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
SW1	3-29-83	4	1,130	ND	758
SW2	3-29-83	ND	92	ND	29
	4-25-83	ND	293	ND	56
	5-18-83	ND	24	ND	6
SW3	3-29-83	ND	92	ND	24
	4-25-83	ND	244	ND	42
	5-18-83	ND	11	ND	2
SW4	3-28-83	ND	437	ND	121
SW5	3-28-83	16	544	ND	133
SW6	3-29-83	5	642	ND	122
	4-25-83	ND	57	ND	22
	5-18-83	ND	3	ND	6
SW7	4-25-83	ND	811	ND	127
SW8	4-25-83	ND	337,035	ND	50,847

* Detection limit 1.0 µg/l.

was less in April with 10 cfs in Bear Creek and 0.1 cfs in the ditch at SW6. A sample collected a short distance above SW2 on Bear Creek (SW7) had higher concentrations of both TCP and PCP. A point source of surface water runoff (SW8) from the sump at Resaw #2 dip tank was identified a short distance above SW7 on Bear Creek. Dye was used to determine the surface water origin of this seep on the south bank of Bear Creek (SW8). Concentrations of both PCP and TCP in this seep (SW8) were high (Table 1).

Samples collected May 18 after a week of slight precipitation had the lowest concentrations of chlorophenols at all locations. There was a greater difference between the two stations on Beaver Creek and concentrations in the drainage ditch at SW6 were low. Discharge in Bear Creek was estimated as 10 cfs and in the drainage ditch at Bear Creek less than 0.1 cfs.

Additional information on ground water as it relates to Bear Creek is presented in Section 5.0.

4.0 SOIL, DEBRIS AND SEDIMENT

4.1 Introduction

The soils in the immediate vicinity of the Avison Mills 4 and 5 and Resaw 2 are Sawtell silt loam, Dayton silt loam, and a small amount of Clackamas silt loam north of Mill 4 (Soil Conservation Service 1982). Extensive fill has been emplaced in the log storage area west of Mills 4 and 5, at Mills 4 and 5 and the area immediately east of these mills, and in the area of the former Beaver Pond near the Beaver Mill.

4.2 Methods

Soil samples were obtained from the sides of pits excavated to 1 m depths, using a backhoe, at eight locations. Pits were located adjacent to the two dip tanks (A1 and A2 on Figure 1), at six sites within the treated lumber storage area and the transit corridor to that area (B1 - B6) and at two sites in the log storage area west of Mills 4 and 5 (D1 and D2).

Samples were collected using equipment detergent-washed and triple rinsed with tap and distilled water and with solvent prior to obtaining each sample. Samples were obtained from the 0-20 cm depth in the log yard and from the scraped sides of the pits at the 0-5, 15-20, 45-50, and 95-100 cm depths in each of the pits. Samples of soil comprised gravel, soil and wood particles. Prior to analysis, larger gravel and wood particles were removed. Soil samples were refrigerated for transport to the laboratory and kept frozen until analyzed.

Debris samples were collected from two debris piles comprised of larger wood particles and soil at two locations (C1 and C2, Figure 1). Samples were obtained from 0-20 cm depths near the base of these two piles.

Sediment samples were collected from two sites in Bear Creek where surface water samples were collected (E1 and E2, Figure 1). Samples were also collected at a site on the small drainage ditch northwest of Mills 4 and 5 (E3). Three bottom grabs were collected and composited from each site using equipment prepared as described for soil sampling.

The soil samples were prepared for analysis by FID gas chromatography based on the EPA method for the analysis of sediment for phenols (EPA 600/4-81-055). Approximately 5 g of wet soil or sediment was weighed and used for the GC analysis. A similar amount was weighed, oven dried, and reweighed to permit expression of results on a dry weight basis. Quality assurance included recovery from spiked soil samples, duplicate analyses and split sample comparisons with DEQ laboratory analyses. The amount of agreement between BEAK and DEQ for the split sample from the 0-5 cm depth at pit B1 was less than with the water analyses. BEAK measured higher levels of chlorophenols in the split sample analyzed (µg/kg [ppb], detection limit 250 µg/kg BEAK; 100 µg/kg DEQ; ND = not detectable):

	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
BEAK	ND	73,464		185,700
DEQ	ND		19,000	55,000

High levels were measured by both and the ratio of the ore isomer of TCP to the PCP was similar for both.

4.3 Results

Levels of chlorophenols in soil and debris samples collected March 28 and 29, 1983 are given in Table 2. The highest concentration of chlorophenols was found in the sample from station B1, a site near the road used to haul treated lumber from the dip tank to the storage area. This site was selected because it receives runoff from much of the haul road. Site B2 is also along this haul road but receives runoff from a smaller section of the road. Next highest concentrations were from samples near the two dip tanks (A1 and A2) (Table 2).

The lowest chlorophenol concentrations in soil were found in samples from the log storage area (D1 and D2) and from sites in the treated lumber storage areas (B3 - B6). No chlorophenols were found in two samples from B6. Chlorophenols were also found in samples from the debris sites (C1 and C2).

Generally, there were decreasing concentrations with increasing depth within the 1-m deep sample sites (A1, A2, B1 - B6). There were various exceptions to this (Table 2), particularly at sites B3, B4, and B6. Cross contamination between the surface and bottom soil levels could not be completely avoided and this may have contributed to these exceptions.

The soil samples varied widely in the relative composition of rock, wood and soil materials. Table 3 provides an estimation of these relative proportions in the volumes excavated from each of the sample sites.

Soil samples were also obtained by continuous drive sampler from the well installed near Resaw #2 dip tank (GW3). Results of analyses of these samples are reported in the Ground Water section of this report.

Table 2. Concentration of tetrachlorophenols (TCP) and pentachlorophenol (PCP) in soil samples collected March 28 and 29, 1983.

Sample Date	Sample Location	Sample Depths (cm)	Concentration (µg/kg dry sample weight)* 2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	Pentachlorophenc
DIP TANK AREAS						
3-28-83	A1	0 - 5	3,656	299,524	987	639,333
"	A1	15 - 20	ND	31,433	ND	50,055
"	A1	45 - 50	285	7,867	ND	11,362
"	A1	95 - 100	75	2,226	ND	11,642
3-28-83	A2	0 - 5	619	18,537	ND	22,738
"	A2	15 - 20	157	28,860	ND	35,606
"	A2	45 - 50	302	20,604	64	29,931
"	A2	95 - 100	ND	821	ND	1,392
OFF TRAVEL ROAD						
3-28-83	B1	0 - 5	8,860	676,118	17,963	842,228
"	B1	15 - 20	23,865	1,298,220	9,610	1,186,020
"	B1	45 - 50	2,134	568,369	ND	562,304
"	B1	95 - 100	ND	70,858	ND	153,661
3-28-83	B2	0 - 5	148	3,056	ND	9,901
"	B2	15 - 20	ND	17,468	ND	14,072
"	B2	45 - 50	89	658	ND	7,418
"	B2	95 - 100	74	8,781	ND	6,428
LUMBER STORAGE AREA						
3-28-83	B3	0 - 5	ND	4,840	ND	5,545
"	B3	15 - 20	ND	553	ND	1,287
"	B3	45 - 50	ND	ND	ND	794
"	B3	95 - 100	ND	203	ND	1,160
3-28-83	B4	0 - 5	ND	167	ND	1,234
"	B4	15 - 20	ND	ND	ND	163
"	B4	45 - 50	ND	ND	ND	44
"	B4	85	ND	245	ND	1,277
3-28-83	B5	0 - 5	ND	608	ND	815
"	B5	15 - 20	ND	250	ND	1,109
"	B5	45 - 50	ND	52	ND	592
"	B5	90	ND	ND	ND	151
3-28-83	B6	0 - 5	ND	254	ND	1,748
"	B6	15 - 20	ND	ND	ND	ND
"	B6	45 - 50	ND	ND	ND	ND
"	B6	95 - 100	ND	ND	ND	535
DEBRIS PILES						
3-29-83	C1	0 - 20	ND	302	ND	960
"	C2	0 - 20	ND	ND	113	900
LOG STORAGE AREA						
3-29-83	D1	0 - 5	970	334	140	784
"	D2	0 - 5	ND	ND	ND	357

*Detection limit, 40 µg/kg dry weight.

Table 3. Estimated compositions and volumes of excavated soil samples and debris (see Table 2, for chlorophenol concentrations, and Figure 1 for station locations).

	Percent Composition*					
STATION	B	C	G	S	W	EXCAVATED VOLUME
A1	5	20	30	45	0	35 ft^3
A2	10	25	50	15	0	35 ft^3
B1	0	0	5	55	40	35 ft^3
B2	0	15	30	50	5	35 ft^3
B3	40	35	20	5	0	35 ft^3
B4	60	25	10	5	0	30 ft^3
B5	55	20	15	5	0	35 ft^3
B6	60	20	15	5	0	35 ft^3
C1	0	0	0	15	85	0.5 ft^3
C2	0	0	0	10	90	0.5 ft^3
D1	0	5	70	20	5	0.25 ft^3
D2	0	5	70	20	5	0.25 ft^3

*B = Boulder - >23 cm +
C = Cobble - 5 - 23 cm
G = Gravel - 0.3 - 5 cm
S = Soil - <0.3 cm
W = Wood (chips, debris, etc.)

Levels of TCP and PCP in sediment collected March 28 and 29, 1983 from the drainage ditch at site E3 (Figure 1) were higher than in those from Bear Creek sediment (E1 and E2) (Table 4). The drainage ditch sediment also contained measurable levels of the other two TCP isomers (2,3,4,5-TCP and 2,3,5,6-TCP) (Table 4).

The known extent of probable PCP contamination of soil in the vicinity of the mills based on historical handling of treated lumber is indicated on the aerial photograph by dashed lines (Figure 1). Soil sample analyses showed chlorophenols both inside and outside this area. Chlorophenol levels in soils are highest where spillage and/or transport to the sampled location is known to be greatest, namely near the dip tanks and at a site receiving surface runoff from the transport road and treated lumber storage area. Generally, concentrations of chlorophenols were highest within 20 cm of the surface at most locations.

Table 4. Concentration of tetrachlorophenols and pentachlorophenol in sediment samples collected March 28 and 29, 1983 (see photo Figure 1 for sample location).

Sample Location	Sample Date	Concentration (µg/kg dry sample weight)*			
		2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	Pentachlorophenol
E1	3-29-83	ND	107	ND	198
E2	3-29-83	ND	442	ND	1,886
E3	3-28-83	837	1,824	380	7,073

*Detection limit, 40 µg/kg dry weight.

5.0 GROUND WATER HYDROLOGY

5.1 Introduction

This section reports on the work done by BEAK to the Avison property. The following were of primary importance in the investigation:

- o The subsurface geologic framework controlling the occurrence and movement of ground water beneath the property;
- o The presence or absence of pentachlorophenol (PCP) and tetrachlorophenol (TCP) in the ground water;
- o The concentrations of these contaminants in the ground water; and
- o The location of any contaminated ground water.

The hydrogeologic investigation was initiated with a review of existing geologic and hydrologic literature including:

- o Published reports (Hampton 1972, Trimble 1963);
- o Thesis (Harper 1946);
- o Oregon Department of Environmental Quality water analyses results; and
- o Oregon Water Resources Department well logs.

This information was collected and reviewed to define the regional and local hydrology, and to provide information on completion depths and water quality from existing water supply wells.

Field investigation included drilling six test wells, and completing five of these wells as multiple piezometers. Water levels were monitored in the completed piezometers, and water samples were collected for chemical analysis to determine the presence and concentration of chlorophenols. Single borehole tests were conducted on ten piezometers to determine transmissivity and permeability of the water bearing units beneath the Avison property.

Water samples were submitted to a certified laboratory for chlorophenol analysis. The analyses results were reviewed to determine if chlorophenols were present in ground water, and in what concentrations.

5.2 Regional Hydrogeology

The Avison property is located in the physiographic subarea of the Molalla-Salem slope known as the transitional slope between the Cascade foothills and the Willamette River valley (Hampton 1972). Rocks underlying the area surrounding Molalla consist of non-marine sediments of the Pliocene Troutdale formation. Individual beds within the Troutdale are comprised of siltstone, sandstone, and conglomerate (Trimble 1963). Most exposures of the Troutdale Formation in the Molalla area consist of tuffaceous sandstone and siltstone. Weathered surfaces are generally tan, cream, or light green (Hampton 1972). Thin beds of pebble conglomerate are also common at these exposures (Hampton 1972). The Troutdale conglomerate is moderately well compacted and cemented to a dense consistency. Individual beds of less indurated sandstone and conglomerate within the Troutdale Formation comprise the principal aquifers in the Molalla area.

Logs of local water supply wells indicate the majority of the wells are completed at depths less than 100 feet. A small number of wells are completed

between 225 to 275 feet below land surface. A few wells are completed between 100 and 170 feet below land surface. Well logs indicate the presense of extensive unconsolidated clay between 30 and 170 feet below land surface. The clay is interbedded with thin, apparently discontinuous lenses or layers of coarser grained sand and pebble gravel penetrated by some wells between 30 to 100 feet below land surface.

Static water levels in wells completed above the clay zone are generally less than 40 feet from land surface. Static water levels in wells completed below the clay zone are generally greater than 180 feet below land surface. This indicates the presence of an aquifer system perched in the more permeable Troutdale sands and gravels overlying the clay zone, and another occurring below the clay zone. Static water levels in the wells completed beneath the clay may represent the potentiometric surface on the regional water table.

Most local water supply wells are completed using open end techniques, and the use of well screens is rare. A few wells are completed using torch-slotted liners. These completion techiques commonly result in high well inefficiency. Specific capacities of wells are generally less than five gallons per foot, primarily resulting from well inefficiency and low permeability of formations in which the wells are completed.

5.3 Site Hydrogeology

5.3.1 Methods

5.3.1.1 Drilling and Sampling

Six test wells were drilled on the Avison property using cable tool methods between April 25 and May 3, 1983. The wells were drilled 8-inch diameter and

completed as multiple piezometers. Continuous drive sampling was attempted while drilling Test Well 1, however, large cobbles comprising the gravel between land surface and 18.0 feet prevented driving the sampler a sufficient distance for sample recovery. Consequently, only samples from 2.0 to 2.3, and 10.0 to 10.4 feet were recovered between land surface and 18.0 feet. Continuous, undisturbed drive samples were recovered from 18.0 feet to the total depth of the well at 41.0 feet. Portions of these drive samples were retained at 2-foot increments for later chemical analyses.

Sampling was accomplished by driving a 2-inch diameter piston corer ahead of the drilled hole into undisturbed formation. The sampler was then extracted and the driven sample of undisturbed formation was extruded from the corer. The portion of the sample to be retained for chemical analysis was placed in prepared jars, sealed for preservation, and placed on ice for shipment to the laboratory.

Once the driven sample had been collected, the drill hole was advanced to the depth of the drive sample interval. An 8-inch steel casing was advanced by driving during drilling to prevent the drill hole from collapsing. The hole was bailed clean of drill cuttings, and the drive sampler was again inserted for sampling the next two undisturbed feet. This sequence was repeated at 2-foot intervals until total depth was reached. Water was added to the drill hole to aid drilling in non water bearing formations.

During drilling and sampling, all undisturbed core samples and drill cuttings recovered from the test well were examined and described by the BEAK on-site hydrogeologist. The entry of ground water into the test boring was also noted, and the depths of zones at which water was entering and the rate of water

entry was also recorded. Water levels associated with water bearing zones were also measured and recorded.

Test Wells 2, 3, and 5 were drilled using the same techniques as Test Well 1, except no continuous drive samples were taken during drilling. Geologic logs generated for Test Wells 2, 3, and 5 are based upon cuttings recovered during drilling. Test Wells 4 and 6 were also drilled using these same techniques as Test Well 1, except no continuous drive samples were taken, and the 8-inch steel casing was only advanced to a depth of about 13.0 feet. Test well locations are shown on Figures 1 and 2.

Test Wells 4 and 6 were drilled open hole below 13.0 feet to their respective total depths of 38.5 and 33.4 feet. Drilling open hole permitted the direct visual observation of the formations penetrated, and observation of any infiltration of ground water from these formations into the open borehole.

5.3.1.2 Piezometer Construction

Once the test wells were drilled to their respective total depths, the holes were bailed clean and piezometer construction was begun. The test wells were completed as multiple piezometers by first backfilling the well to slightly below the depth at which the sensing tip of the piezometer was to be placed, and setting a seal of 1/2-inch bentonite pellets. Backfill material consisted of mortar sand or mortar sand mixed with bentonite powder. Bentonite seals were poured at least six inches thick. A six-inche layer of pea gravel was placed on top of the bentonite seal, and the piezometer was lowered down the hole such that the screened interval was directly opposite the zone to be monitored. The annulus between the piezometer and the 8-inch casing was backfilled with pea

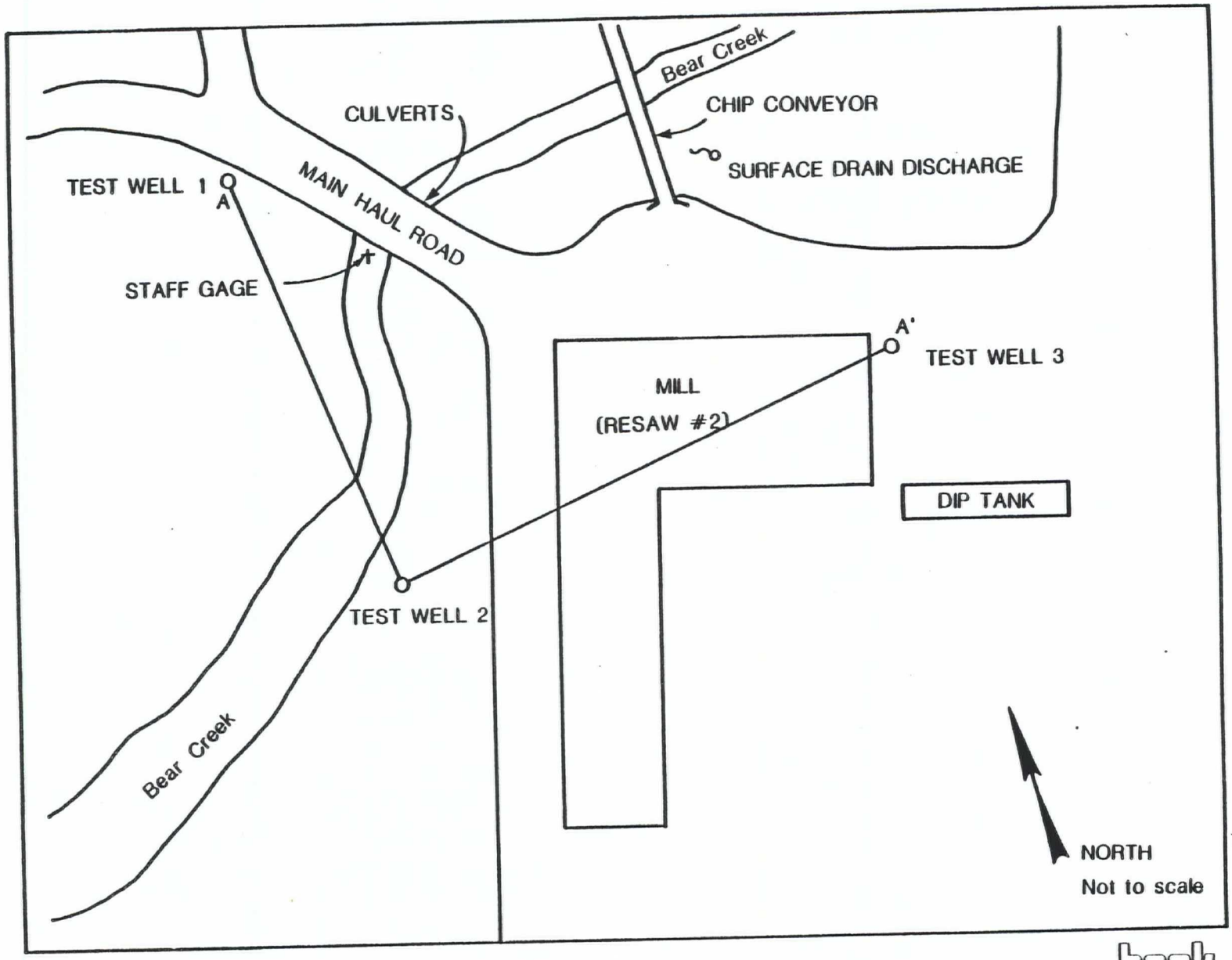


Figure 2. Locations of test wells and mill facilities near Bear Creek.

gravel to a depth six inches above the top of the screen, and another 6-inch thick bentonite seal was placed. A backfill of mortar sand or mortar sand mixed with bentonite was placed on top of the bentonite seal until the depth was reached at which the next piezometer was to be placed.

The 8-inch steel casing was continually extracted from the test hole during piezometer construction. Backfill within the steel casing was generally kept between two to four feet and the casing extracted as the various backfill, seal, and gravel pack materials were placed in the hole. Test Wells 2, 5, and 6 were completed with two piezometers, while Test Wells 1 and 3 were completed with three piezometers.

Individual piezometers consist of 2-inch threaded flush joint PVC pipe. Screens are comprised of a 2-foot section of 0.020-inch pre-sawn, slotted PVC pipe. The end of the screen assembly is fitted with a slip cap held in place with stainless steel sheet metal screws. Each PVC piezometer sticks up above land surface, and is equipped with a vented slip cap.

Each test well was sealed at land surface with bentonite placed on top of the backfill material. A cement seal was placed from 3 feet to land surface. A locking monument case consisting of 8-inch diameter steel pipe with a hinged lid and padlock was set into the cement. This case encloses and protects the PVC piezometers. The piezometers stand above the land surface reletative to their depths. The tallest piezometer monitors the shallowest zone in the test well, and the shortest piezometer monitors the deepest zone. Piezometers are designated S = shallow, I = intermediate, and D = deep; however, these completion depths do not refer to specific water bearing zones.

5.3.1.3 Development

The piezometers were developed to increase the efficency of their hydraulic continuity with the zone which they monitor. Development was accomplished by surging and lifting water from the hole with compressed air or by bailing. Air lifting was conducted within the screened zone to remove fine-grained particles which had infiltrated from the formation into the piezometer through the screen. Water was later air lifted from the hole by positioning the air lift at least one foot above the screened zone such that the formation around the screened interval was not disturbed. Air lifting continued until the water discharging from the piezometers was sand free and relatively clear.

Discharge from piezometers during air lifting was determined by timing the flow of water into a container of known volume. Discharge rates were measured frequently and recorded. Air lifting was continued for a maximum of seventy minutes or until the discharged water was sufficiently clear for sampling.

The shallower piezometers did not have sufficient submergence for effective air lifting, and were developed by surging and removing water with a stainless steel and teflon water bailer. Bailing was conducted at a constant rate, and the bailed water was collected in containers of known volume over a measured time to determine discharges. Bailing of shallow piezometers was continued until the water was sufficiently sand free and clear for sampling, or the water level within the piezometer had been bailed down and would not recharge at a rate adequate to sustain bailing.

5.3.1.4 Sampling

Water samples for chemical analyses were taken near the conclusion of air lifting or bailing. The samples were collected in prepared sample bottles and the bottles were then placed on ice for shipment to the laboratory. A separate sample was collected for analysis of field parameters including temperature, pH, and conductivity.

5.3.1.5 Water Level Monitoring

Water levels in completed piezometers were monitored using an electric water level sounder calibrated to 0.01 foot. The distance to the water level was measured from a measuring point (MP) located at the top of the 8-inch locking monument case. The measuring point elevations were surveyed to 0.01 foot relative to an arbitrary 100-foot datum established at the concrete pad on which the upper dip tank is located. The arbitrary 100-foot elevation and the location of each individual measuring point is noted with a spot of fluorescent orange paint. This measuring system and the survey elevations allow the determination of relative water level elevations to within 0.01 foot. A staff gage was established in Bear Creek (Figure 2), and its elevation was also surveyed so the elevation of the Bear Creek water surface could be determined within 0.01 foot. Table 5 presents a summary of measuring point elevations.

5.3.1.6 Hydrologic Testing

Individual piezometers were tested to determine the transmissivity and permeability of the zones in which the piezometers were completed. The tests were accomplished by air lift recovery, bailer recovery, and slug injection methods.

Table 5. Elevations of measuring points to arbitrary datum.

Location	Measuring Point	Elevation in Feet
Test Well 1	top of 8-inch casing	86.50
Test Well 2	top of 8-inch casing	86.69
Test Well 3	top of 8-inch casing	88.18
Test Well 4	concrete at land surface	92.84
Test Well 5	top of 8-inch casing	101.82
Test Well 6	top of 8-inch casing	89.72
Staff Gage	top of gage	78.75
Bench Mark (Arbitrary datrum)	concrete pad next to upper dip tank	100.00

Discharge was measured during air lift and bailer development. Piezometers were air lifted or bailed at relatively constant rates for an amount of time sufficient to induce hydrologic stress on the zones in which the piezometers were completed. Water level measurements were then taken at prescribed intervals during recovery after air lifting or bailing had ceased. The recovery data was analyzed by methods developed by Jacob (Lohman 1979) to determine transmissivity and permeability.

Slug injection tests were conducted on piezometers which would not yield a sufficient amount of water to adequately stress the water bearing zone in which they were completed. The slug injection tests were accomplished by instantly adding a known volume of water to the piezometer and monitoring the water level change within the piezometer for a short time after injection. The water level data were analyzed by methods described in Lohman (1979) to determine transmissivity and permeability. Several of the piezometers which were tested using air lift and bailer recovery methods were also slug injection tested to compare test results.

5.3.1.7 Tracer Test

Several catch basins and drains were noted in the area near the dip tank at Resaw #2. A dye test was conducted to determine where drains from these catch basins discharged. Ten gallons of rhodamine dye solution were injected into a catch basin near Test Well 3. The dye was observed to discharge in a wet area next to Bear Creek by a chip convenyor (Sample location W8). This indicates that the wet area results from the discharge of surface water drainage from the lower dip tank area, and not from ground water. The locations of the dip tank and the surface water drain discharge are shown on Figure 2.

5.3.1.8 Chlorophenol Leaching Test

A chlorophenol leaching test was performed on a composite soil samples from test pits B1, R2, and B3, consisting of equal portions by weight of these samples. Mixing of the soil composite with water was performed on a tumbler with a rotational speed of approximately 70 rpm. In the test, 360 g of the soil composite was tumbled at 20 C for 24 hours with 540 ml of laboratory grade deionized water (five pore volumes, assuming 30 percent soil pore volume). After a brief settling period, the liquid phase was centrifuged in a desk top clinical centrifuge and the resulting supernatants were combined and analyzed for tetrachlorophenols and pentachlorophenol. The solid phases from the centrifugations were suspended, returned to the tumbling container, and the process was repeated two more times. The 24-, 48-, and 72-hour liquid pahses were assigned sample numbers 99C-101C. The samples contained large amounts of humic materials which resulted in a brown, nearly opaque appearance of the samples. No further settling was observed after several days of refrigerated storage.

5.3.2 Results

5.3.2.1 Geology

Test Well 1 was drilled between test pit B1 and Bear Creek as soils from test pit B1 were found to have the greatest levels of chlorophenol contamination (Figures 1 and 2). Drilling at Test Well 1 encountered a poorly sorted mixture of clay, silt, sand, and gravel with pieces of wood, wood chips, sawdust, and wire rope from 0 to 10.0 feet below land surface. This material was implaced as artifical fill, in or near the area which used to be a log pond. The fill was saturated below three feet, and appeared permeable during drilling.

A brown, dense, silty cobble gravel was encountered at 10.0 feet. Drilling action broke up individual cobbles, but fragments recovered from this zone indicated that probable size of individual particles could reach 10 inches. Pieces of cobbles with intact matrix were retrieved. The matrix consisted of a compact, poorly sorted, very silty sand. Sand grains in the matrix were well cemented to original surfaces of the larger clasts. Matrix colors varied from gray, brown, green, blue, to black, and resembled the Troutdale conglomerate described by Hampton (1972). The silty cobble gravel extended to 18.0 feet below land surface and was sufficiently indurated to be termed conglomerate. No water was encountered in this unit during drilling.

Brown, dense, silty coarse sand was encountered from 18.0 to 20.0 feet. As the bore hole penetrated this material, water rose in the hole indicating that the sand was water bearing. The color of the sand changed to blue-gray at 20.0 feet, and a thin, very hard siltstone was interbedded from 22.7 to 22.9 feet. The sand continued to 26.7 feet where a dark gray, loose, medium to coarse grained sand was encountered. The dark gray sand persisted to 29.6 feet where gray, stiff silt with pieces of wood was penetrated. The entire sand desposit was unconsolidated.

The test well was advanced 11.0 feet into the gray silt to confirm its stratigraphic position and thickness. A one foot layer of brown, very fine to fine sand was encountered at 39.0 feet. No water was encountered in the gray silt, but as the hole advanced into the fine sand, water entry was noted. During piezometer construction, water from the 39-foot zone was flowing over the 8-inch casing two feet above land surface, indicating that the water existed under artesian conditions. The geologic log of Test Well 1 is included in the Appendix.

Test Well 1 was completed as three piezometers to monitor water bearing zones including the one foot sand layer between 39.0 and 40.0 feet, the silty fine to medium sand at 27.0 to 29.0 feet, and the fill at 2.0 to 4.0 feet. Completion details for Test Well 1 are included in the Appendix.

Test Well 2 was drilled next to Bear Creek between the dip tank at Resaw #2 and the creek (Figures 1 and 2). Crushed rock fill was encountered between land surface and 2.0 feet. From 2.0 to 9.8 feet, a brown organic silt with pieces of wood and wood chips was encountered which was also apparently emplaced as fill. This silt may include some original fine grained organic sediments which were deposited in a swampy environment along Bear Creek. The fill appeared saturated below 3 feet.

A brown, dense silty cobble gravel similar to that encountered in Test Well 1, and described by Hampton (1972) was penetrated in Test Well 2 at 9.8 feet. Matrix colors were similar to those in Test Well 1, and the material was sufficiently cemented to be termed a conglomerate. No ground water was encountered throughout this deposit.

Unconsolidated blue-gray, medium dense, fine to medium grained sand was encountered at 19.0 feet. As drilling penetrated into the sand, water rose in the borehole indicating that the sand was saturated under artesian conditions. The sand continued to 28.0 feet were a 1.5 foot layer of silty cobble gravel was encountered to 29.5 feet. The borehole was driven from 29.5 feet into gray silt with pieces of wood to a total depth of 33.0 feet. A thin layer of peat was enountered in the silt at 32.5 feet. The geologic log of Test Well 2 is included in the Appendix.

Test Well 2 was completed as two piezometers to monitor water bearing zones including the silty fine to medium sand at 26.0 to 28.0 feet, and the fill at 8.0 to 10.0 feet. Completion details for Test Well 2 are included in the Appendix.

Test Well 3 was located just north of the lower dip tank between the dip tank and Bear Creek (Figures 1 and 2). Asphalt, and gravel emplaced as a pavement base, were encountered from land surface to 2.0 feet. Gray silt with cobbles and wood was penetrated between 2.0 feet and 9.5 feet, and included a 6-inch diameter log at 7.0 feet. This material was probably emplaced as artifical fill, however, it may be at least partially mixed with original fine grained sediment deposited under marshy conditions adjacent to Bear Creek. The deposit was saturated below 3 feet.

Brown, dense, silty cobble gravel was encountered at 9.5 feet, and persisted to 23 feet. The cobble gravel is similar to the conglomerate encountered in test wells 1 and 2, and yielded no water to the borehole.

An unconsolidated, blue-gray, medium dense, silty, fine to medium grained sand was encountered at 23.0 feet. As drilling penetrated the sand, the water rose in the borehole indicating the sand was water bearing under confined conditions. The sand became more pebbly at 25.0 feet, and continued to a depth of 33.0 feet where a brown to gray clayey silt was encountered. The silt contained pieces of wood, and the borehole was advanced to a total depth of 35.5 feet to confirm the silt's presence. The geologic log for Test Well 3 is included in the Appendix.

During drilling, water entry was noted in a less indurated zone within the conglomerate between 17.0 and 19.0 feet. Test Well 3 was completed as three piezometers to monitor the water bearing zones including the silty fine to medium grained sand at 30.5 to 32.5 feet, the conglomerate between 17.0 and 19.0 feet, and the fill between 7.0 and 9.0 feet. Completion details for Test Well 3 are included in the Appendix.

Test Well 4 was drilled just south of the treated lumber storage area between where the lumber is stored and Bear Creek (Figure 1). Crushed rock and boulders were penetrated from land surface to 2.5 feet. This material had been emplaced as fill to support the weight of mill equipment and stored lumber. Gray to brown clayey silt was penetrated at 2.5 feet. The hole was advanced through this fine grained deposit to a total depth of 38.5 feet. The deposit graded finer with depth becoming a silty clay by 20.0 feet. Several color changes were also noted during drilling. The clayey silt grades to orange-brown at 10.0 feet, to yellow-brown at 15.0 feet, and to blue-gray at 17.5 feet.

The test well was drilled open hole from 13.0 feet to total depth. The open hole was bailed dry, and no water was visually observed entering the hole. An electric water sounder was lowered into the hole and indicated that only several feet of silty slurry remained in the bottom of the hole from water added during drilling. This fluid level was monitored for a short time and no change in water level was observed, confirming that no water was entering the borehole. The hole was backfilled with a mixture of mortar sand and bentonite, and a concrete seal was set at land surface. The geologic log of Test Well 4 is included in the Appendix.

Test Well 5 was drilled just southwest of the dip tank near Test Mill 1 between the dip tank and Bear Creek (Figure 1). Crushed rock and cobbles emplaced as fill to support mill machinery and facilities were encountered to 1.6 feet below land surface. A dark brown, clayey, organic silt was encountered between 1.6 and 2.9 feet. Gray to brown silty cobble gravel similar to that encountered in Test Wells 1, 2, and 3 was penetrated at 2.9 feet. The gravel was sufficiently indurated to be termed a conglomerate, and persisted to 12.2 feet.

Unconsolidated, gray to brown, medium dense, silty sand with a few cobbles was encountered at 12.2 feet. Cobbles became more prevalent within the sand at 13.5 feet, and persisted to 15.8 feet. Water entered the borehole at 12.2 feet and rose within 3.0 feet of land surface after a short time.

Gray to brown silty cobble gravel was encountered between 15.8 and 23.0 feet. The gravel was similar to the conglomerates found at the other test holes. No water was encountered in the conglomerate. Brown, medium dense, poorly sorted silty, fine to medium sand and gravel was penetrated between 23.0 and 28.0 feet. The sand and gravel was water bearing and the water rose in the borehole indicating that the water was under confined conditions. The test boring was bottomed in brown to gray clayey silt from 28.0 feet to a total depth of 30.0 feet. The geologic log of Test Well 5 is included in the Appendix.

Test Well 5 was completed with two piezometers to monitor the water bearing zones in the silty sand at 12.8 to 14.8 feet, and in the sand and gravel at 25.5 to 27.5 feet. Completion details for Test Well 5 are included in the appendix.

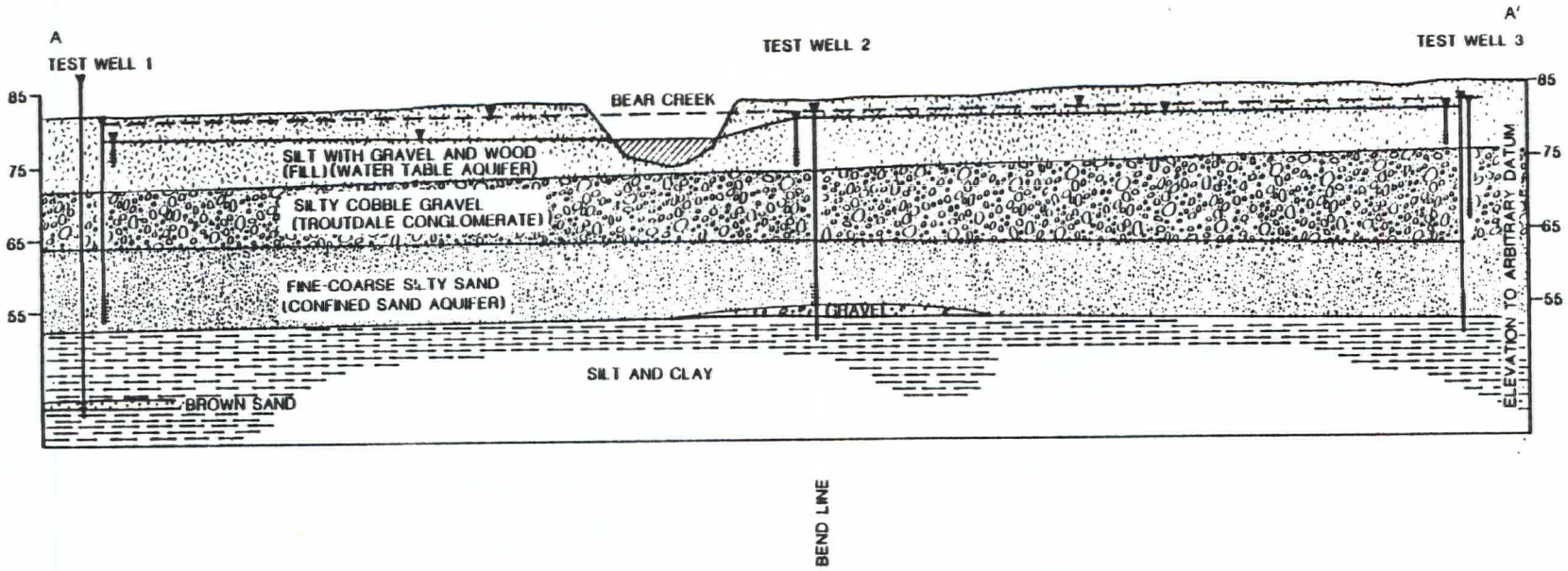
Test Well 6 was drilled south and west of Mill 5 near the western edge of the Avison property between the mill and the log storage area (Figure 1). Artifical fill consisting of dark brown organic silt with wood and crushed rocks

was encountered between land surface and 9.5 feet. Brown to gray dense silty cobble gravel similar to the previously described conglomerate was encountered between 9.5 feet and 17.9 feet. No water was detected in the conglomerate during drilling, and the hole was drilled open-hole from 13.0 feet to total depth.

Brown pebbly silt was encountered at 17.9 feet, and persisted to the total depth of 30.4 feet. The silt was more clayey and less pebbly from 24.0 to 27.0 feet. The geologic log of Test Well 6 is included in the Appendix.

No water was noticed entering the open borehole during drilling, however two piezometers were placed in the test well. One piezometer was placed at the base of the conglomerate between 15.0 and 17.0 feet to monitor water which may saturate the conglomerate, but may not enter the borehole over a short period of time. The second piezometer was placed at the base of the artificial fill between 7.0 and 9.0 feet to monitor any water which may accumulate in the fill under water table conditions. Completion details for Test Well 6 are included in the Appendix.

Test Wells 1, 2, and 3 were located sufficently close to define subsurface geologic conditions in the area near Bear Creek and the dip tank (Figure 2). Test Wells 4, 5, and 6 provide information only on the area immediately surrounding those wells. Figure 3 is a generalized geologic cross section presenting the subsurface stratigraphy at Test Wells 1, 2, and 3. As illustrated in this figure, four distinct sedimentary deposits occur as relatively horizontal layers under Bear Creek. The uppermost of these layers is poorly sorted artificial fill overlying a silty cobble gravel conglomerate. The conglomerate overlies fine to coarse sand, and the sand is underlain by silt and clay. Logs of



Potentiometric surface in confined land aquifer

Potentiometric surface in water table aquifer

Figure 3. Generalized geologic cross section A-A' through Avison property near Bear Creek (see cross section location on Figure 2).
Vertical scale 1" = 10'
Horizontal scale 1" = ~30'
Vertical Exaggeration 3x

local water supply wells indicate that the silt and clay probably extends to a depth of at least 150.0 feet below land surface.

5.3.2.2 Water Level Monitoring

Water level measurements and geologic logs from Test Wells 1, 2, and 3 indicate the presence of three separate water bearing zones. The uppermost zone occurs in the artificial fill mantling the land surface near Bear creek. Water in this zone occurs under water table conditions and defines a potentiometric surface with elevations ranging from 79.32 to 81.44 feet to arbitrary datum. Water in this zone is in direct hydraulic connection with Bear Creek. On May 16, 1983, Bear Creek water surface elevation was 77.85 feet, representing the base level and lowest point on the potentiometric surface of the water table aquifer. Figure 4 is a map showing the potentiometric surface on the artificial fill water table aquifer.

The artificial fill overlies a conglomerate layer which acts as an aquitard perching water in the overlying fill, and confining water in the underlying fine-coarse silty sand. The confined sand aquifer overlies the silt and clay which presumably extends to at least 150 feet below land surface. Water levels in piezometers completed in the confined sand aquifer define a potentiometric surface with elevations ranging from 81.30 to 81.84 feet to arbitrary datum. This potentiometric surface is up to several feet higher than that of the overlying water table aquifer and Bear Creek. Figure 5 shows the potentiometric surface on the confined sand aquifer. Potentiometric surfaces are also depicted on the geologic cross section (Figure 3).

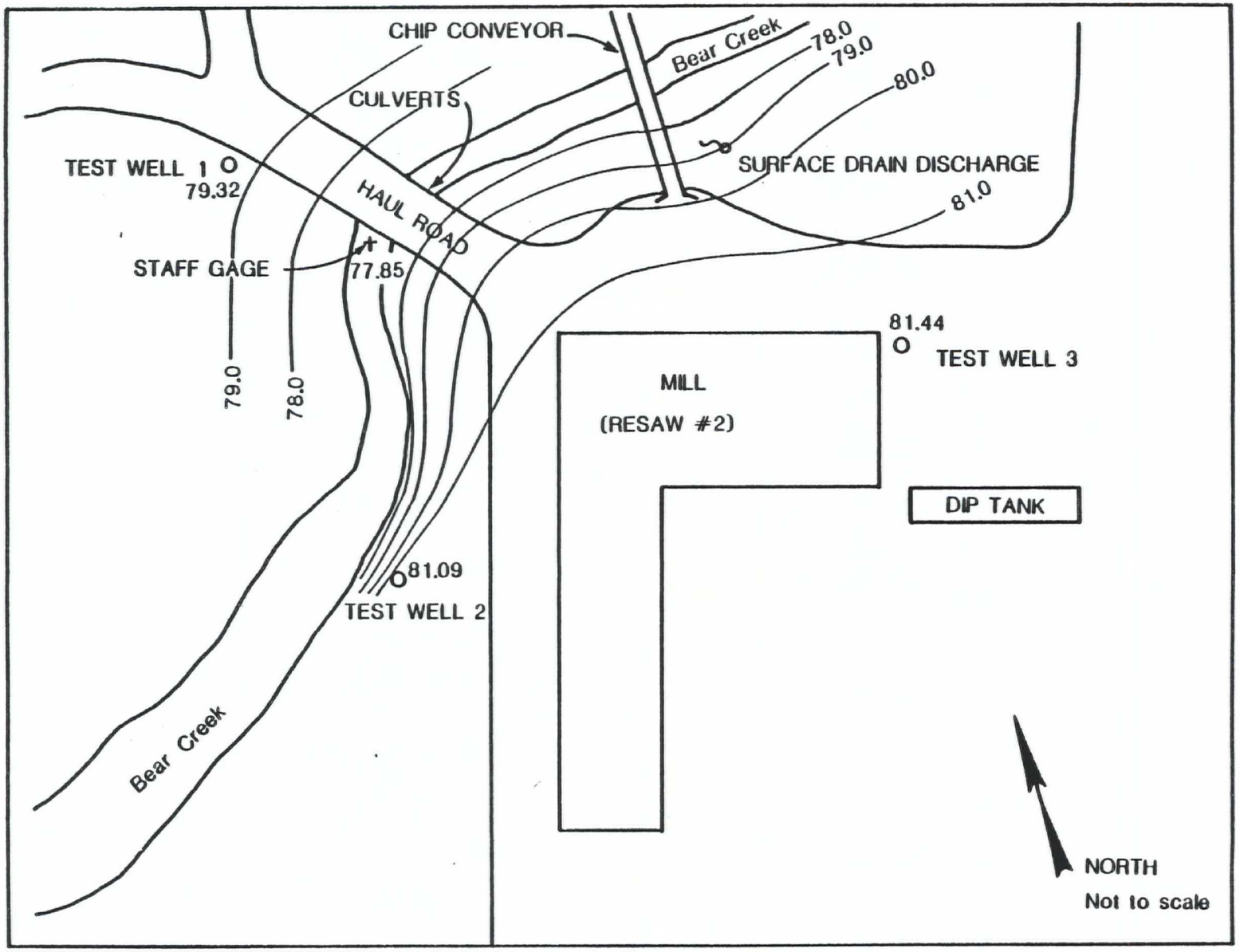


Figure 4. Potentiometric surface on water table aquifer 16 May 1983 (contour interval 1 foot; - 79.0 - elevation to arbitrary datum).

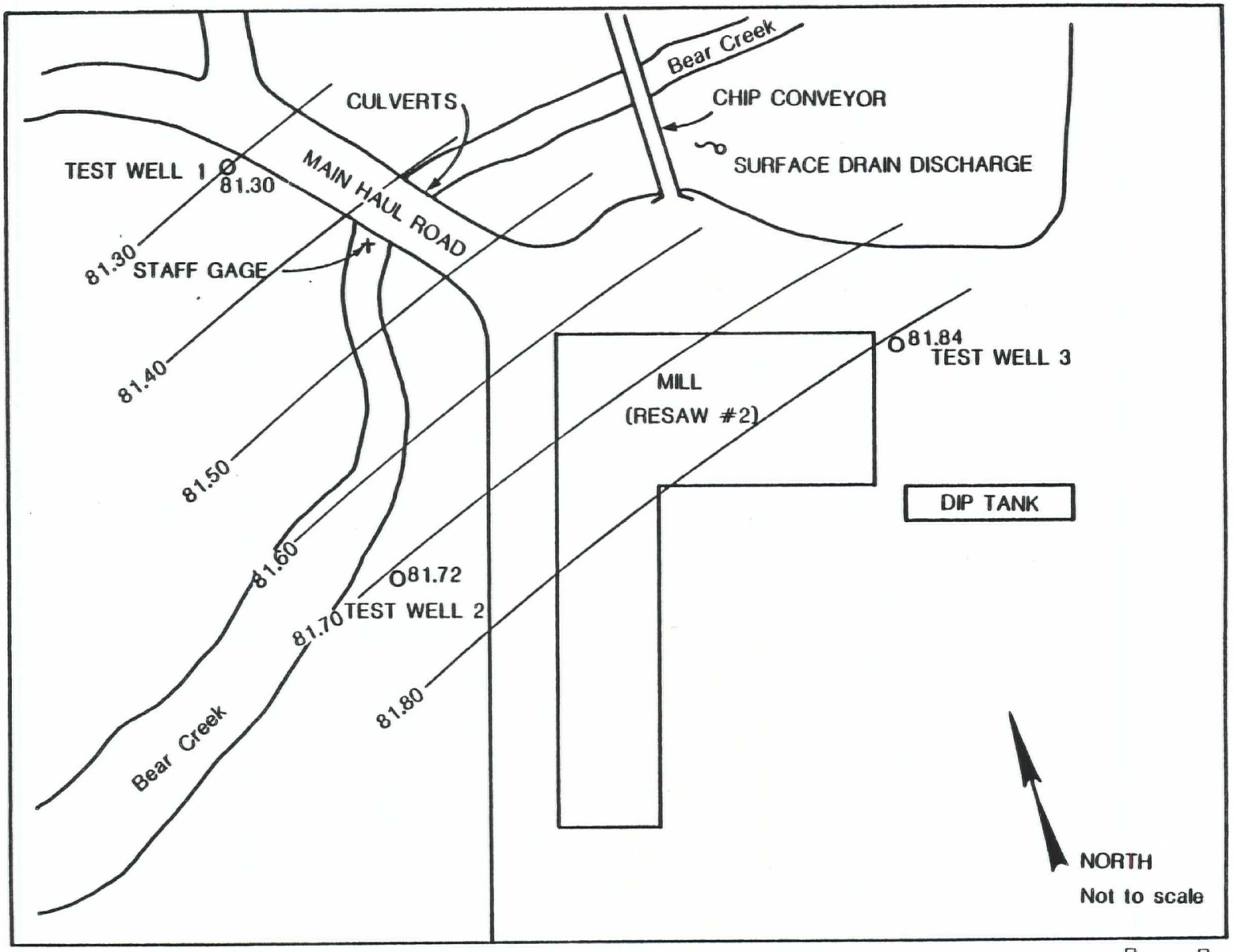


Figure 5. Potentiometric surface on confined sand aquifer 16 May 1983 (contour interval 0.1 foot;- 81.50 - elevation to arbitrary datum).

The deepest piezometer in Test Well 1, completed at 39 to 40 feet in a fine sand layer, has a hydrostatic head higher than both the water table aquifer and the confined sand aquifer. The water level in this deep piezometer has an elevation of 85.26 feet to arbitrary datum. The lateral extent of this thin fine sand layer is not known.

One piezometer in Test Well 3 was installed in a less indurated, somewhat permeable zone within the Troutdale conglomerate. The water level within this zone has an elevation between the water table aquifer and the confined sand aquifer. The presence of this permeable zone within the conglomerate suggests that upward leakage from the confined sand aquifer into the overlying water table aquifer may occur. The rate of this leakage is probably quite low. The intermediate water level associated with the conglomerate between the potentiometric surfaces on the confined sand aquifer and the water table aquifer (Figure 3) also supports this hypothesis. Leakage between the two aquifers in the area of Test Wells 1, 2, and 3 can be calculated as a function of the head differences between the potentiometric surfaces of the two aquifers, the transmissivities of the formations involved, and the area over which leakage takes place. Because the deeper aquifers had increasing hydrostatic pressure which should preclude the vertical downward movement of potentially contaminated water from land surface, this calculation was not performed. The results of water level monitoring on May 16 and 19, 1983 are presented in Table 6.

Water levels in piezometers completed at Test Well 5 indicate that the lower water bearing zone is under artesian conditions. The water level elevation associated with the lower zone was 96.97 feet to arbitrary datum on May 16th, as opposed to the water level in the upper water bearing zone which is at a lower

Table 6. Water level elevations.

Piezometer*	16 May 1983		19 May 1983	
	Depth to Water in feet	Elevation to arbitrary datum in feet	Depth to Water in feet	Elevation to arbitrary datum in feet
1-S	7.18	79.32	7.25	79.25
1-I	5.20	81.30	5.19	81.31
1-D	1.24	85.26	1.22	85.28
2-S	5.60	81.09	5.95	80.74
2-D	4.97	81.72	5.15	81.36
3-S	6.74	81.44	6.88	79.62
3-I	6.58	81.60	6.68	79.82
3-D	6.34	81.84	6.46	80.04
5-S	5.06	96.76	5.17	96.65
5-D	4.85	96.97	4.78	97.04
6-S	DRY	-----	DRY	-----
6-D	16.15	73.57	17.27	72.45

Bear Creek staff gage = 77.85' No reading taken
*Number refers to well number; letter refers to piezometer depth (S=surface, I=intermediate, D=deep)

elevation of 96.76 feet. The conglomerate separating the two water bearing zones acts as a aquitard, and the degree of hydraulic communication between the two zones through the aquitard is not known.

No water was measured in the upper piezometer completed in artificial fill at test boring 6. Water measured in the deeper piezometer completed at the base of the conglomerate had an elevation of 73.57 feet on May 16, 1983. This elevation is significantly below the elevations of potentiometric surfaces associated with known water-bearing units in the study area. Water was bailed out of the lower piezometer after the initial water level measurement was taken. The water level in this piezometer three days later had an elevation of 72.45 feet. This level is significantly depressed when compared to those in other piezometers within the study area, and suggests that the water occurring in the piezometer is remnant from the drilling process. As demonstrated by the drilling of Test Wells 4 and 6, and by the water level monitoring in Test Well 6, there appears to be no significant occurrence of shallow ground water on the western portion of the Avison property.

5.3.2.3 Hydrologic Testing

Piezometers at Test Wells 1, 2, 3, and 5 were tested to determine the hydraulic characteristics of transmissivity and permeablility of the water-bearing formations in which the piezometers were completed. These tests were conducted to facilitate the prediction of the movement of potentially contaminated ground water within the water bearing zones identified during the study.

Most of the tests were conducted using the air lift recovery method. Other tests included slug injection and bailer recovery. Single borehole test results

are shown in Table 7. Different tests were conducted in several piezometers to cross check results. Permeabilities of water bearing zones were generally quite low, ranging from 1 gpd/ft^2 to 1050 gpd/ft^2. The majority of permeabilities were well below 100 gpd/ft^2.

5.3.2.4 Water Quality Sampling and Analyses

Water quality samples were collected for field analysis of pH, temperature, and conductivity. Conductivity and pH values may be slightly altered by air lifting, but still provide an indication of general water chemistry. Samples were also collected and preserved for later chlorophenol analyses. The results of field analyses are presented on Table 8. The pH of water collected from piezometers completed in the water table aquifer at Test Wells 1, 2, and 3 ranged from 5.9 to 6.8. The lower pH is probably the result of acids formed in association with sawdust and wood in the artificial fill comprising the water table aquifer. The pH of water collected from deeper, confined zones ranges from 6.4 to 6.7.

Water temperature of samples from the water table aquifer was 13.9°C, which was slightly colder than the temperatures of samples from deeper, confined water bearing zones. This cooler temperature of the water table aquifer water probably results from more recent recharge by cold water during the winter. Water temperature in the deeper zones was warmer, ranging from 13.9°C to 15.0°C. Water from the shallow zone at Test Well 5 was coldest at 12.2°C.

Conductivity of water from the water table aquifer ranged from 435 to 900 mhos/cm. These conductivities are somewhat higher than anticipated and

Table 7. Single borehole test results.

Piezometer *	Test Date	Test Type	Water Bearing Zone	Transmissivity	Apparent Permeability
1-S	--	none		--	--
1-I	5/16/83	air lift recovery	confined sand aquifer	590 gpd/ft	54 gpd/ft^2
1-D	5/16/83	air lift recovery		1050 gpd/ft	1050 gpd/ft^2
2-S	15/17/83	bailer recovery	artificial fill	50 gpd/ft	6 gpd/ft^2
2-S	5/19/83	slug injection		8 gpd/ft	1 gpd/ft^2
2-D	5/17/83	air lift recovery	confined sand aquifer	415 gpd/ft	46 gpd/ft^2
2-D	5/19/83	slug injection		350 gpd/ft	39 gpd/ft^2
3-S	5/17/83	bailer recovery	artificial fill	105 gpd/ft	18 gpd/ft^2
3-S	5/19/83	slug injection		100 gpd/ft	17 gpd/ft^2
3-I	5/19/83	slug injection	Troutdale Conglomerate (permeable zone)	55 gpd/ft	28 gpd/ft^2
3-D	5/17/83	air lift recovery	confined sand aquifer	310 gpd/ft	31 gpd/ft^2
5-S	5/18/83	air lift recovery		850 gpd/ft	236 gpd/ft^2
5-D	5/18/83	air lift recovery		80 gpd/ft	16 gpd/ft^2

* Number refers to well number; letter refers to piezometer depth (S=surface, I=intermediate, D=deep)

Table 8. Field parameters of ground water samples.

Sample *	Date	Sampling Method	Water Bearing Zone	Volume of Water Removed Prior to Sampling	Field Field pH	Temp (°C)	Conductivity (µmhos/cm @ 25°C)
1-S	5/16/83	bailer	artificial fill	10 gal	5.92	13.9	435
1-I	5/16/83	air lift	confined sand aquifer	280 gal	6.61	14.4	110
1-D	5/16/83	air lift		210 gal	6.60	15.0	235
2-S	5/17/83	bailer	artificial fill	14 gal	6.24	13.9	900
2-D	5/17/83	air lift	confined sand aquifer	77 gal	6.54	13.9	90
3-S	5/17/83	bailer	artificial fill	5.5 gal	6.80	13.9	480
3-I	5/17/83	bailer	Troutdale conglomerate (permeable zone)	10 gal	6.43	13.9	390
3-D	5/17/83	air lift	confined sand aquifer	140 gal	6.65	15.0	120
5-S	5/18/83	air lift	?	108 gal	6.62	12.2	190
5-D	5/18/83	air lift	?	125 gal	6.52	13.9	145

* Number refers to well number; letter refers to piezometer depth (S=surface, I=intermediate, D=deep)

probably represent constituents dissolved from the artificial fill. Conductivities from deeper water bearing units range from 90 to 390 mhos/cm, with the majority below 235 mhos/cm.

Table 9 presents concentrations of chlorophenols in ground water samples taken from piezometers between May 16 and 18, 1983. No chlorophenols were found in water collected from piezometers 1-S, 1-D, 2-S, 2-D, and 3-D. The only significant concentrations occur in the shallow piezometer at Test Well 5 (5-S). Concentrations in piezometers 5-D, 3-I, 3-S, and 1-I are 4 mg/l or less. These low concentrations could be the result of contamination during the sample collection process. The concentrations in piezometer 5-S are significantly higher and suggest that chlorophenols have entered the ground water at this location. As Test Well 5 is the only test boring installed near the dip tank at this location, the extent of this contamination is not known.

5.3.2.5 Drive Sample Analyses

Drive samples collected during drilling at Test Well 1 were analyzed for chlorophenols. The results of these analyses are presented in Table 10. No chlorophenols were found in any of the samples analyzed.

5.3.2.6 Chlorophenol Leaching Test

The results of the leaching test (Table 11) show that PCP and TCP concentrations were reduced by 50 percent after three 24-hour intervals. This indicates that once the source of PCP and TCP to the Avison property land surface has been eliminated, the contaminants should be mostly removed from the soil by precipitation after a short period of time.

Table 9. Concentration of tetrachlorophenols (TCP) and pentachlorophenol (PCP). in ground water samples May 16-18, 1983, (see Photo, Figure 1, for sample locations).

		Concentration (µg/l)*			
	Water Bearing Zone	2,3,4,5,-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
1-S	artificial fill	ND	ND	ND	ND
1-I	confined sand aquifer	ND	ND	ND	1
1-D		ND	ND	ND	ND
2-S	artificial fill	ND	ND	ND	ND
2-D	confined sand aquifer	ND	ND	ND	ND
3-S	artificial fill	ND	2	ND	2
3-I	Troutdale Conglomerate	ND	2	ND	2
3-D	confined sand aquifer	ND	ND	ND	ND
5-S		1	61	ND	58
5-D		ND	4	ND	4

* Detection limit 1 µg/l.

Table 10. Concentration of tetrachlorophenols (TCP) and pentachlorophenol (PCP) in drive samples from monitoring well number 1 by depth (ft) April 25, 1983 (see Figure 1 for well location).

	Concentration (µg/kg dry weight)			
Sample Depth (ft)	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
2.0 - 2.3	ND	ND	ND	ND
10.0 - 10.4	ND	ND	ND	ND
18.0 - 18.4	ND	ND	ND	ND
20.0 - 20.4	ND	ND	ND	ND
22.0 - 22.7	ND	ND	ND	ND
24.0 - 24.4	ND	ND	ND	ND
26.2 - 26.6	ND	ND	ND	ND
28.0 - 28.3	ND	ND	ND	ND
30.6 - 31.0	ND	ND	ND	ND
33.5 - 33.9	ND	ND	ND	ND
35.5 - 36.5	ND	ND	ND	ND
39.0 - 40.0	ND	ND	ND	ND

* Detection limit 250 µg/kg dry weight.

Table 11. Concentration of tetrachlorophenols (TCP) and pentachlorophenol (PCP) in leachate from composited soil samples B1, B2, and B3 (upper 5 cm of test pit) (see photo, Figure 1, for sample locations).

Leaching Duration	Concentration (µg/l)*			
	2,3,4,5-TCP	2,3,4,6-TCP	2,3,5,6-TCP	PCP
24 hr	ND	1,493	ND	1,184
48 hr	ND	1,101	ND	812
72 hr	ND	706	ND	544

* Detection limit 1 µg/l.

6.0 CONCLUSIONS

Analyses and review of the logs of local water supply wells indicate that a significant, thick silt and clay zone underlies the study area. The silt and clay contain lesser interbeds of sand or sand and gravel. The well logs also show that the silt and clay zone separates two aquifer systems. One aquifer system occurs above the silt and clay, and one is located below it. Static water levels of wells completed in the upper system are near land surface, while those in wells completed deep within or below the silt and clay are quite low.

Test drilling on the Avison property has identified the top of the silt and clay zone, and has further differentiated the hydrology of the upper aquifer system. Test borings 1, 2, and 3 have defined a water-bearing deposit under water table conditions, and a slightly deeper confined sand aquifer in the area near the lower dip tank. The two water-bearing deposits are separated by an aquitard comprised of Troutdale conglomerate.

Water levels measured in piezometers indicate that hydrostatic heads encountered in study area aquifers increase with the depth. This head increase should preclude the vertical downward migration of potentially contaminated surface water, and indicates that if any vertical migration takes place it should be from the deep aquifers to the more shallow water table aquifer and Bear Creek. As Bear Creek has a water level lower than the piezometric surfaces associated with shallow water bearing units in the study area, the entire reach of Bear Creek within the Avison property is probably receiving discharge from the ground water system.

Drilling and monitoring in test wells 4 and 6 indicate that no significant ground water is present in the western portion of the subject property.

The dye injection test performed on drains and catch basins installed to remove surface water from the area near the lower dip tank indicates that the drains discharge at a point very close to Bear Creek. Effluent discharged from this drain flows directly into Bear Creek, a short distance away. Concentra-- tions of chlorophenols in water discharging from this drain are greater than 300,000 g/l. This drain is a significant source of contamination to the creek.

The results of test drilling, dye injection testing, and observations of surface water flow paths and treated lumber handling on the Avison property indicate that the primary method of contamination of Bear Creek is through surface runoff directly to the creek. The surface runoff occurs as overland flow on pavement or short distances across the land surface, and through the shallow drain system located near the lower dip tank and discharging close to Bear Creek. While the ground water occurring in the upper zone at Test Well 5 appears to be slightly contaminated with chlorophenols, the distance from this contamination to the creek and the concentrations of chlorophenols tend to preclude this as a significant source of contamination to Bear Creek.

The primary measure essential to remediate the chlorophenol contamination of Bear Creek is the cessation of the current methods of lumber treatment. The new treating facilities which are presently under construction should prevent the contact of the treating medium with the land surface, and thereby prevent the migration of the chlorophenols to Bear Creek across the land surface. Once the new treatment facilities are operational and the entire treatment process is

totally encapsulated, only residual chlorophenols will remain to reach Bear Creek. As indicated by the chlorophenol leaching test, the amounts of residual contaminants should decrease rapidly with time, until no further contamination of the creek occurs.

BEAK also recommends that piezometers constructed at Test Well 5 be further developed by air lifting and resampled under extremely careful field conditions to substantiate the presence of chlorophenol contamination in the ground water at this location. Samples of ground water from these piezometers should be split and sent to an EPA certified laboratory for analyses and to the Oregon Department of Environmental Quality to confirm the presence of chlorophenol contamination in the ground water at this location. If chlorophenol contamination is present in the ground water at Test Well 5, then remedial measures will have to be taken to prevent spillage of the treating medium from the nearby dip tank on the land surface during the lumber treatment process.

7.0 SELECTED REFERENCES

Bispham, Thomas R. 1983. Regional Manager, DEQ Northwest Region. Letter to Avison Lumber Company dated February 23, 1983.

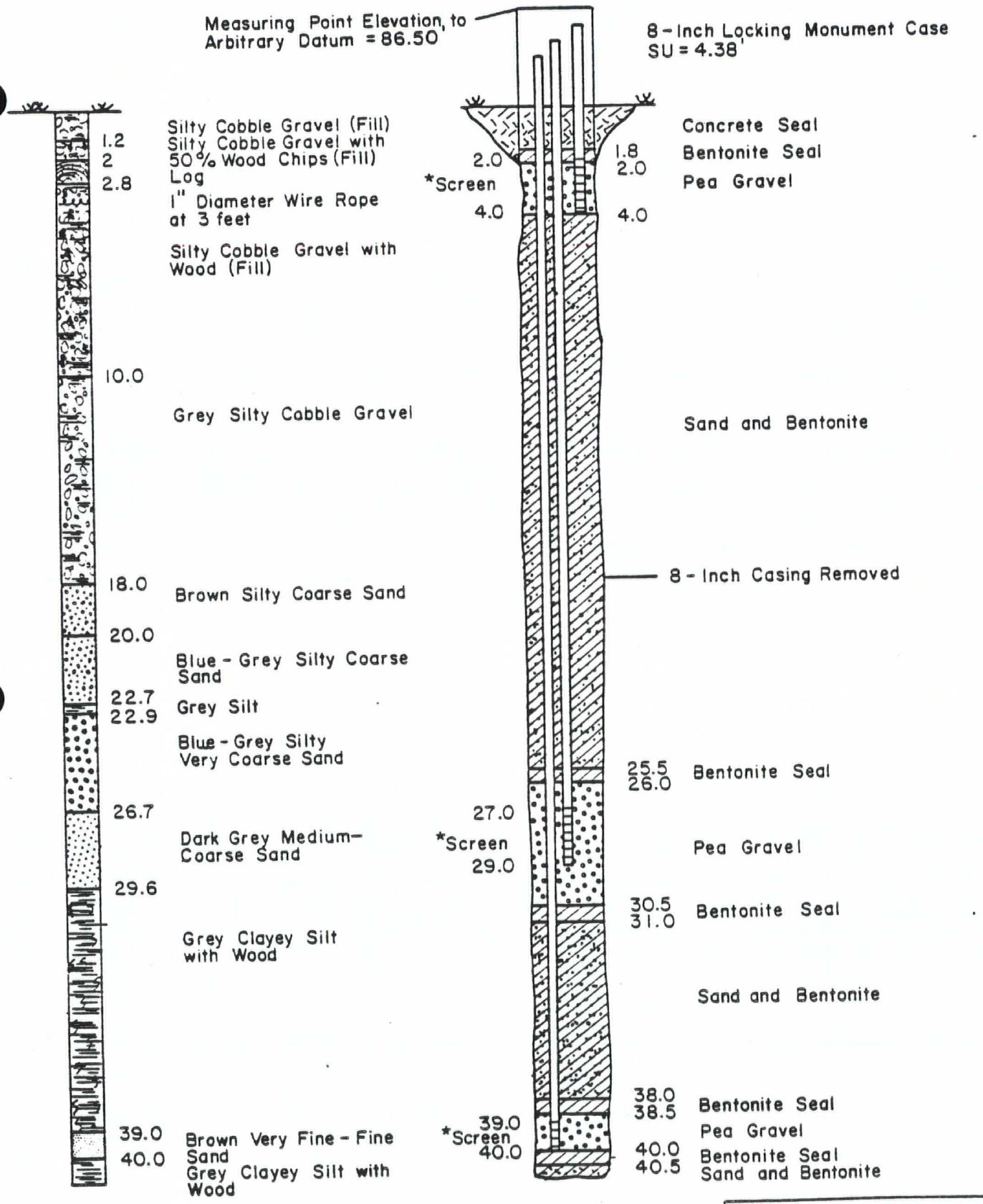
Hampton, E.R., 1972, Geology and ground water supply of the Molalla-Salem Slope area, northern Willamette Valley, Oregon: U.S. Geological Survey Water - Supply Paper 1997.

Harper, H.E., 1946, Preliminary report on the geology of the Molalla Quadrangle, Oregon: Oregon State College Master of Science thesis, 29 p.

Lohman, S.W., 1979, Ground water hydraulics: U.S. Geological Survey Professional Paper 708.

Soil Conservation Service, USDA. 1982. Classification and correlation of the soils of the Clackamas County area, Oregon. West National Technical Center, USDA, SCS, Portland, Oregon. 17 pp.

Trimble, D.E., 1963, Geology of Portland, Oregon, and adjacent areas: U.S. Geological Survey Bulletin. 1119.



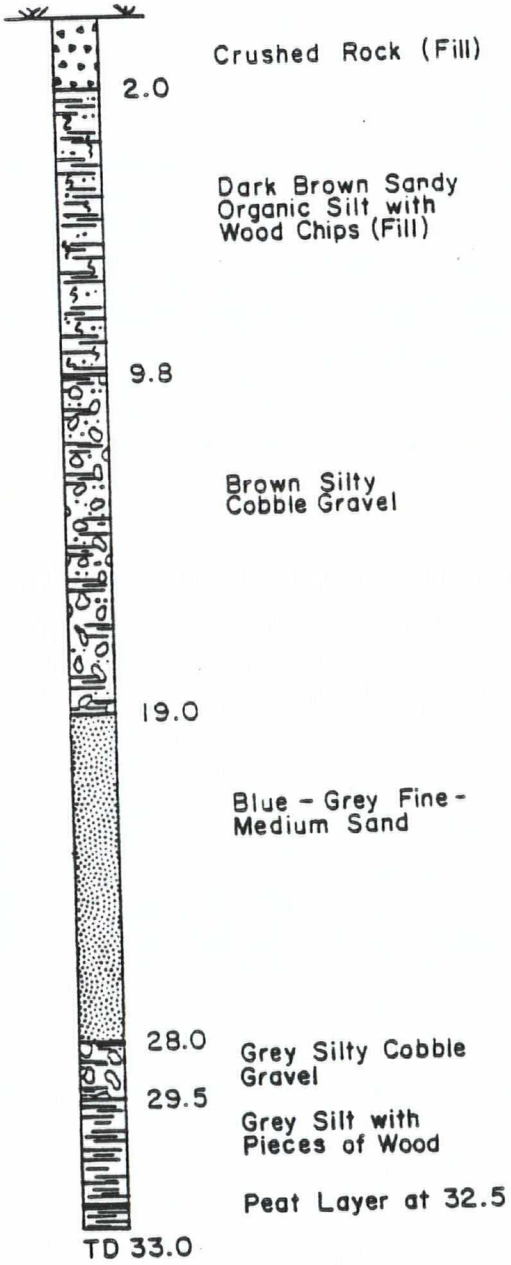
GEOLOGIC LOG

COMPLETION DETAILS

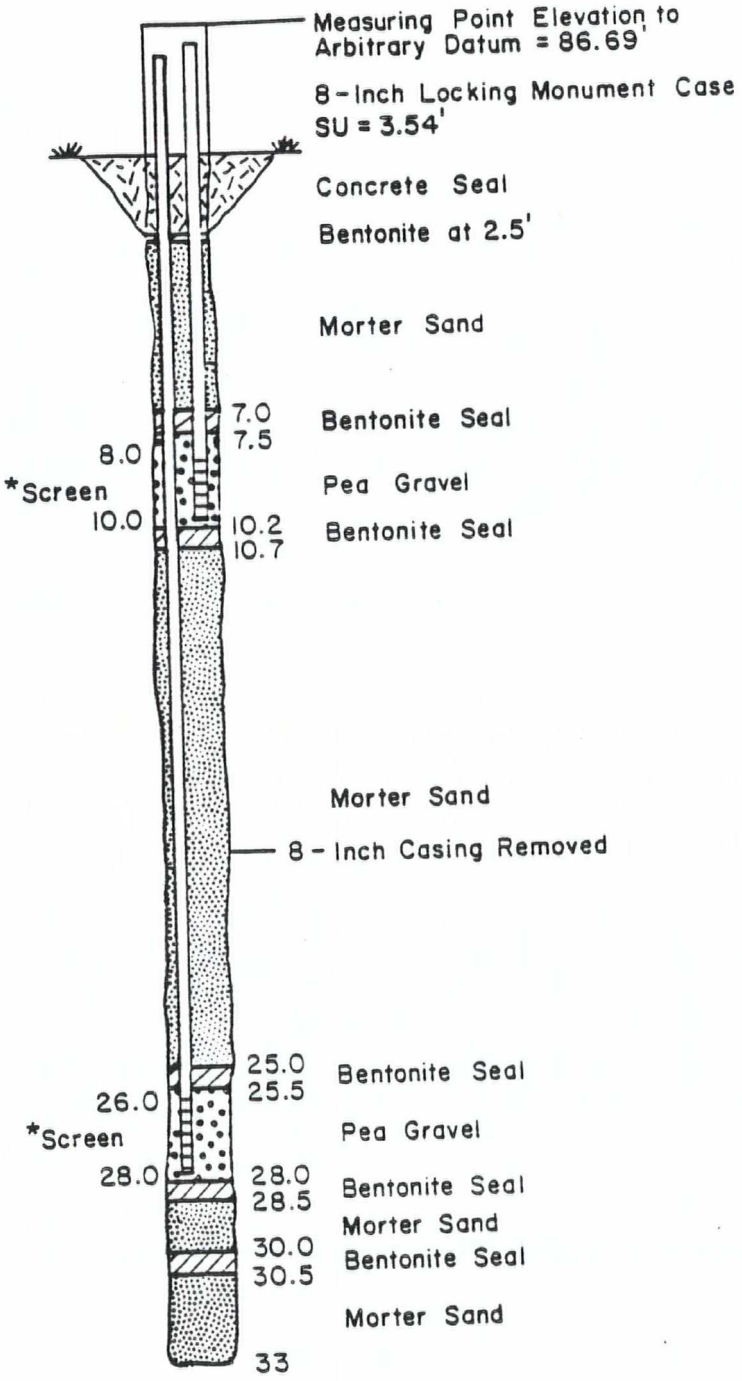
*All screens are .020" pre-sawn slots

All piezometers are 2-inch flush joint, threaded PVC

AVISON LUMBER CO. TEST WELL 1		
LOGGED BY Mackey Smith	PROJECT NO. 02938	DATE 6-1-83
DRAWN BY mr	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale, 1" = 5'		
BEAK CONSULTANTS INCORPORATED		



GEOLOGIC LOG

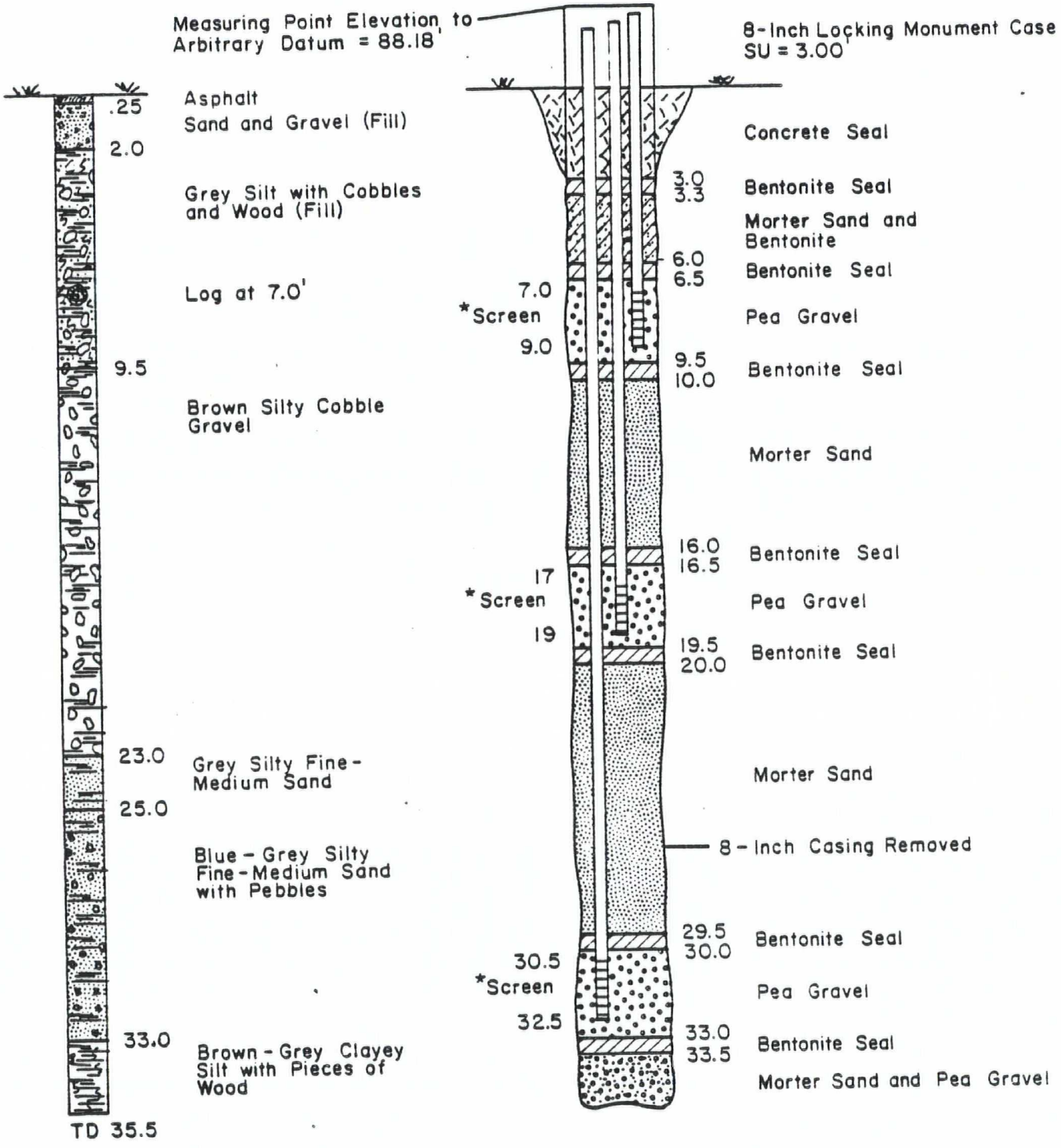


COMPLETION DETAILS

*All screens are .020" pre-sawn slots

All piezometers are 2-inch flush joint, threaded PVC

AVISON LUMBER CO. TEST WELL 2		
LOGGED BY Mackey Smith	PROJECT NO. D2938	DATE 6-1-83
DRAWN BY m r.	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale. 1" = 5'		
BEAK CONSULTANTS INCORPORATED		



GEOLOGIC LOG

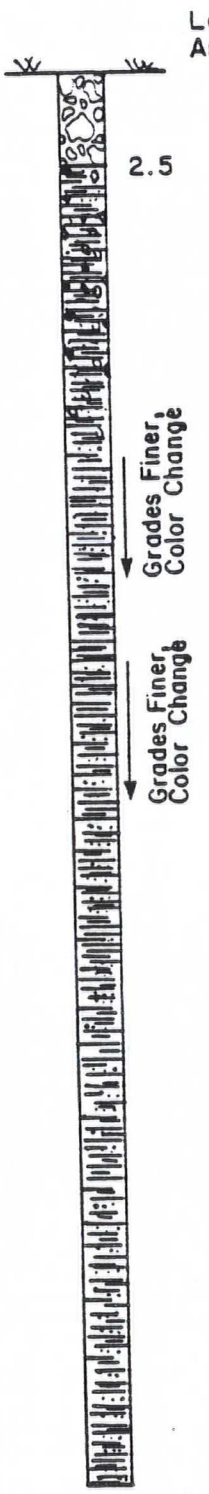
COMPLETION DETAILS

*All screens are .020" pre-sawn slots

Deep and Intermediate piezometers are 2-inch flush joint, threaded PVC

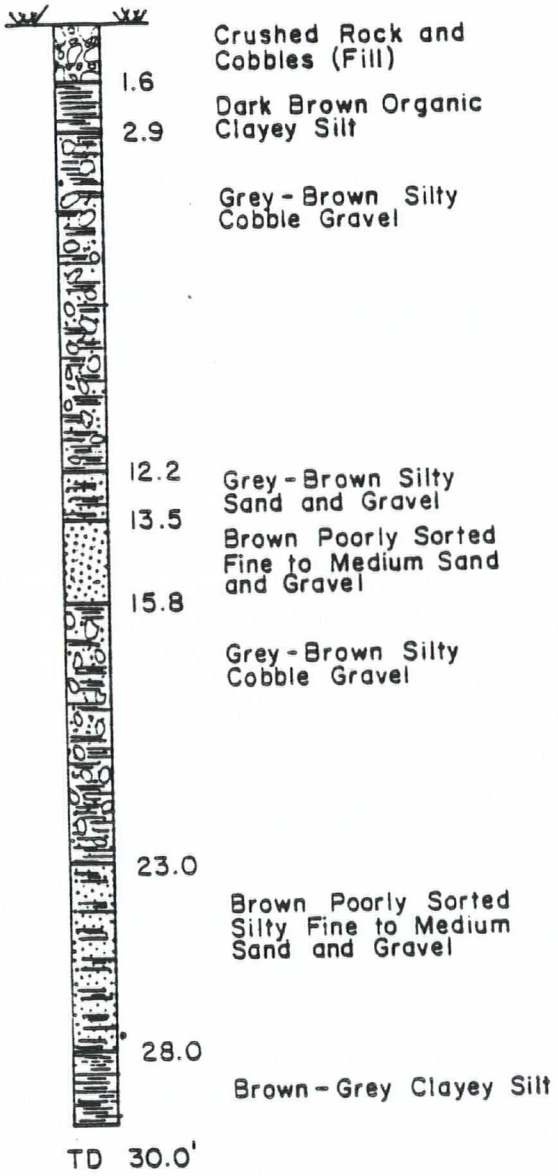
Shallow piezometer is 2-inch PVC with slip couplings held in place with stainless steel screws

AVISON LUMBER CO. TEST WELL 3		
LOGGED BY Mackey Smith	PROJECT NO. 02938	DATE 6-1-83
DRAWN BY m r.	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale. 1" = 5'		
BEAK CONSULTANTS INCORPORATED		

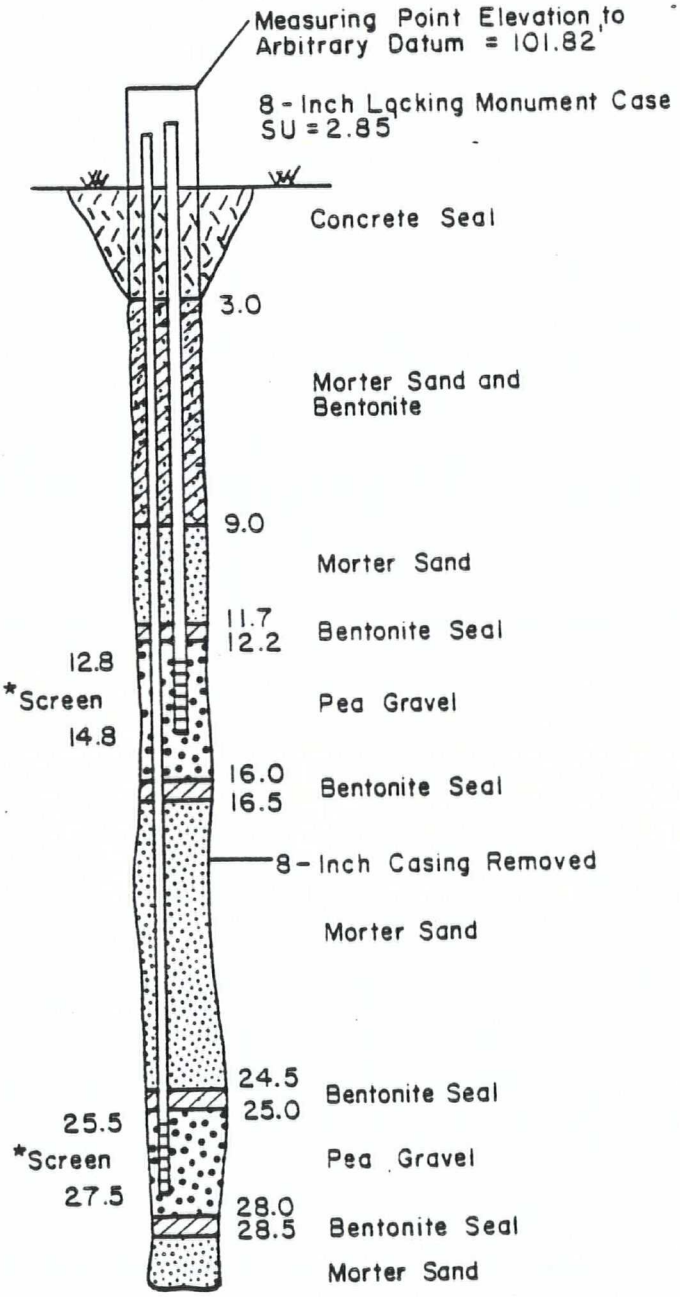


GEOLOGIC LOG

AVISON LUMBER CO. TEST WELL 4		
LOGGED BY Mackey Smith	PROJECT NO. 02938	DATE 6-1-83
DRAWN BY m r.	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale. 1" = 5'		
BEAK CONSULTANTS INCORPORATED		



GEOLOGIC LOG

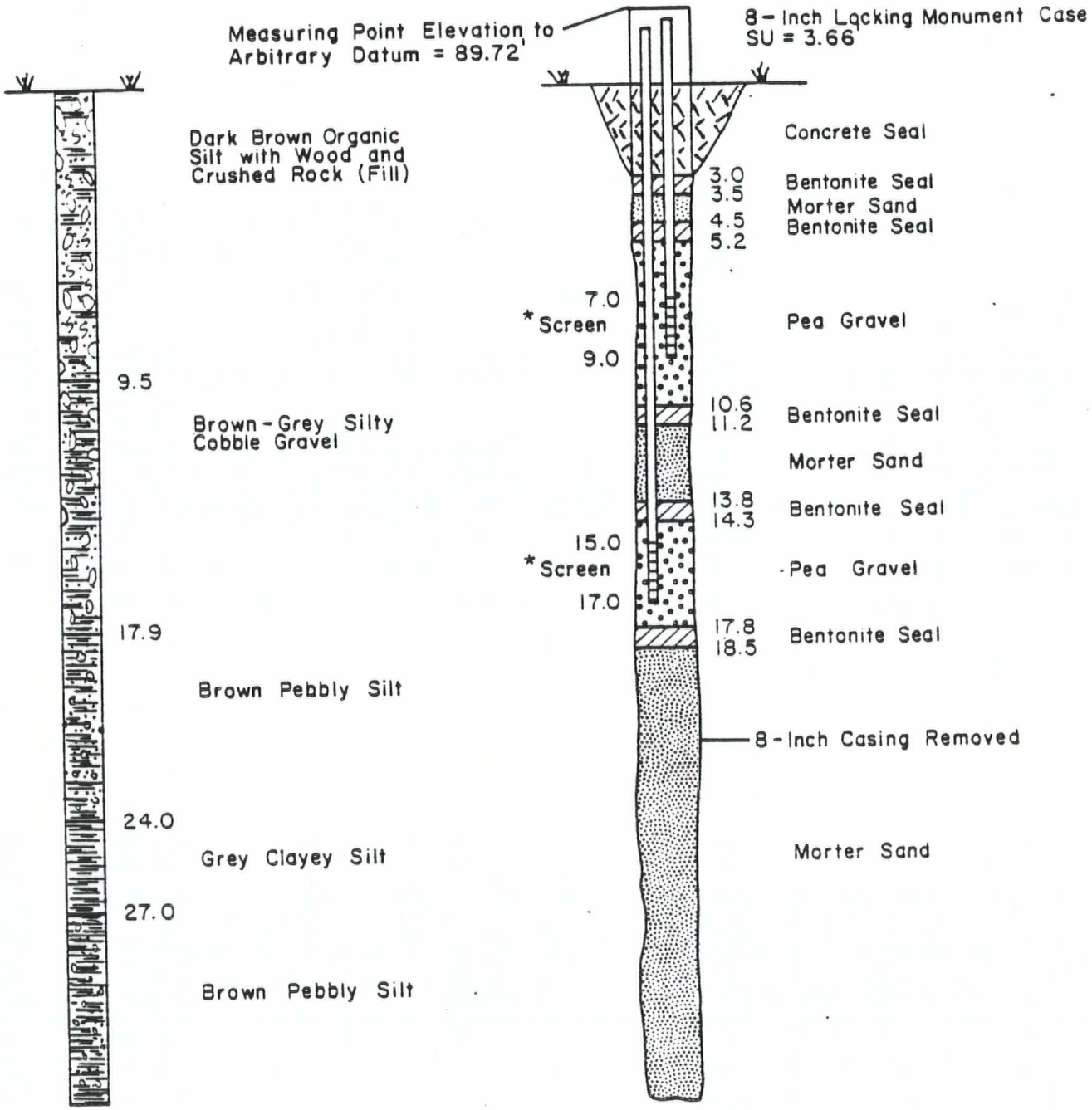


COMPLETION DETAILS

*All screens are .020" pre-sawn slots

All piezometers are 2-inch flush joint, threaded PVC

AVISON LUMBER CO. TEST WELL 5		
LOGGED BY Mackey Smith	PROJECT NO. 02938	DATE 6-1-83
DRAWN BY m r.	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale. 1" = 5'		
BEAK CONSULTANTS INCORPORATED		



GEOLOGIC LOG

COMPLETION DETAILS

* All screens are .020" pre-sawn slots

All piezometers are 2-inch flush joint, threaded PVC

AVISON LUMBER CO. TEST WELL 6		
LOGGED BY Mackey Smith	PROJECT NO. D2938	DATE 6-1-83
DRAWN BY m r.	COMMENTS COMPLETED 4-28-83	
SCALE Vertical Scale. 1" = 5'		
BEAK CONSULTANTS INCORPORATED		

ATTACHMENT 8

STATE OF OREGON

INTEROFFICE MEMO

TO: ~~TRB~~, RHW cc: AQ, HW, WQ DATE: April 16, 1984

FROM: JAB

SUBJECT: PCP/TCP Degradation
Avison Lumber
Publishers Paper - Liberal

On February 27, 1984, RHW and I took a series of samples at Avison Lumber for PCP/TCP analysis. The purpose of the samples was to generate data on the degradation of PCP/TCP in the environment. A description of the sample location, results and conclusions follow.

Sample #1) Surface soil sample taken near the southwest corner of a building approximately 20 feet south of an abandoned dip tank at Mill #1. The tank has not been used since January 1981. The site is not likely to have received recent contamination. The site is exposed to direct sunlight during midday and afternoon.
Results: 10 mg/kg PCP; 5 mg/kg TCP

Sample #2) One inch of soil and wood fiber over concrete pad at the southwest corner of the abandoned dip tank at Mill #1. Recent contamination unlikely. Probable source of PCP/TCP would be spillage and drippage when the tank was in use. Site exposed to direct midday and afternoon sun.
Results: 111 mg/kg PCP; 28 mg/kg TCP

Sample #3) Soil and wood fiber from approximately 2" below the surface at the north end of the abandoned dip tank at Mill #1. Recent

contamination unlikely. Probable source of PCP/TCP would be from spillage and drippage when the tank was in use. The site is exposed to afternoon sun and possible midday sun during the summer.

Results: 4980 mg/kg PCP; 888 mg/kg TCP

These levels are similar to the concentrations in the dip tank when it was in use. They indicate very limited, if any, degradation in the three years since use of the tank was discontinued. There is no clear reason why this sample should have greater contamination than site #2 other than possible less photo degradation due to depth of sample. Sites #2 and 3 are right next to the tank; however, site #3 is slightly lower.

Sample #4) Surface soil behind the abandoned tank at Mill #1. This site is much less likely to be contaminated from past tank use. Recent contamination is unlikely. Very limited exposure to direct sunlight, only midday. The site is surrounded by buildings and the tank.

Results: <1 mg/kg PCP; 39 mg/kg TCP

Degradation possibly responsible for finding TCP but not PCP.

Sample #5) Surface soil from treated lumber storage area at Mill#1. This site is likely to receive ongoing PCP/TCP contamination from recently treated lumber. It is exposed to sunlight most of the day.

Results: 98 mg/kg PCP; 195 mg/kg TCP.

Higher levels of TCP may be from recent contamination which is higher

in TCP and/or from PCP degrading more rapidly than TCP. Recent contamination is the most probable explanation.

Sample #6) Soil and wood fiber from next to the south side of the abandoned dip tank at #3 resaw mill. This was the main dip tank at Avison prior to the new tank which replaced it in October 1983. The sample was likely contaminated with PCP/TCP from drippage and spillage when the old tank was in operation. Large puddles of spilled liquid from the tank had been observed at this site. The site was unlikely to be contaminated by recent mill activities. The site has full exposure to the sun.

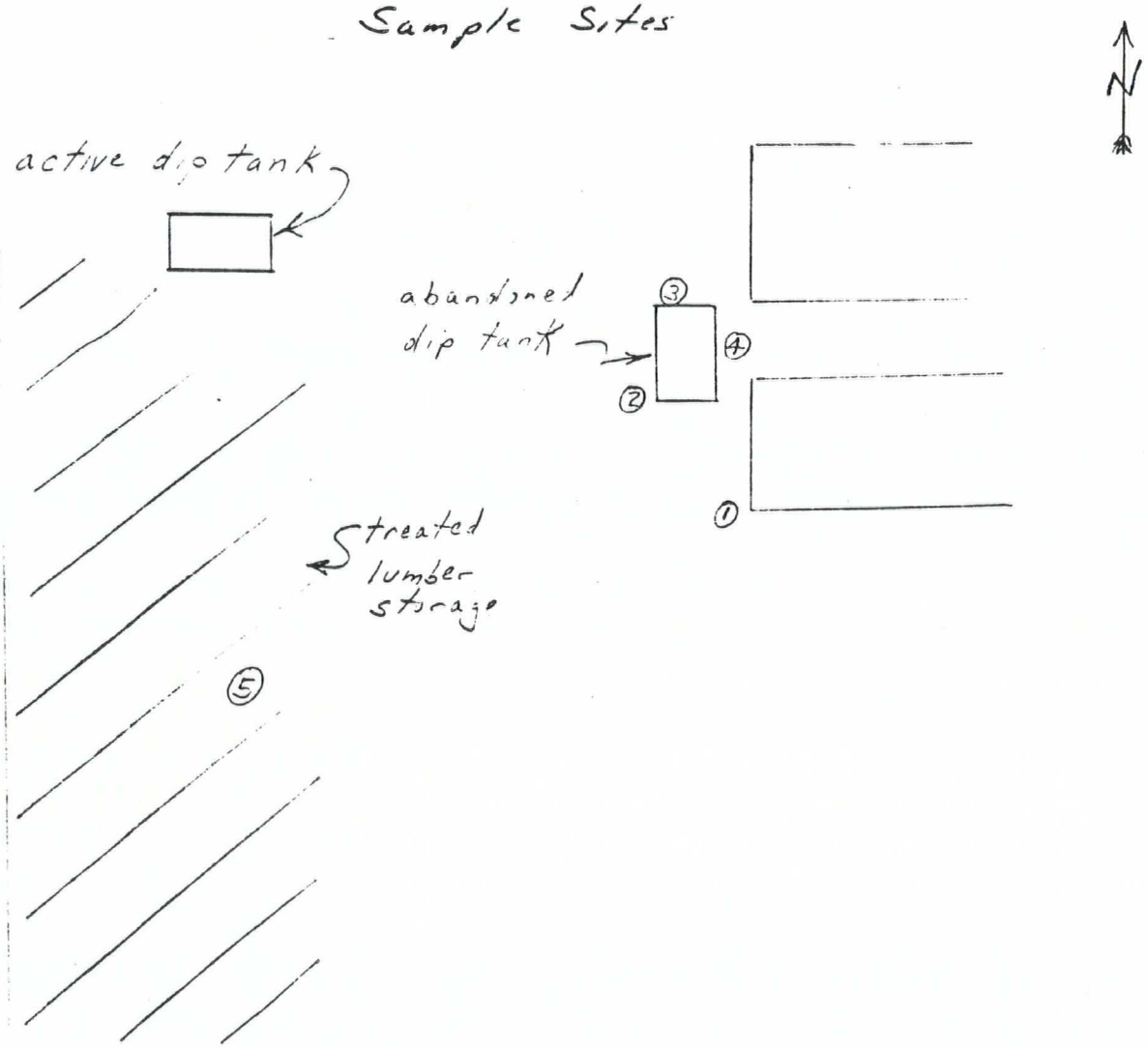
Results: 1400 mg/kg PCP; 1930 mg/kg TCP.

These levels approximate the levels in the tank when it was active, and therefore, do not indicate any significant degradation since the tank was abandoned.

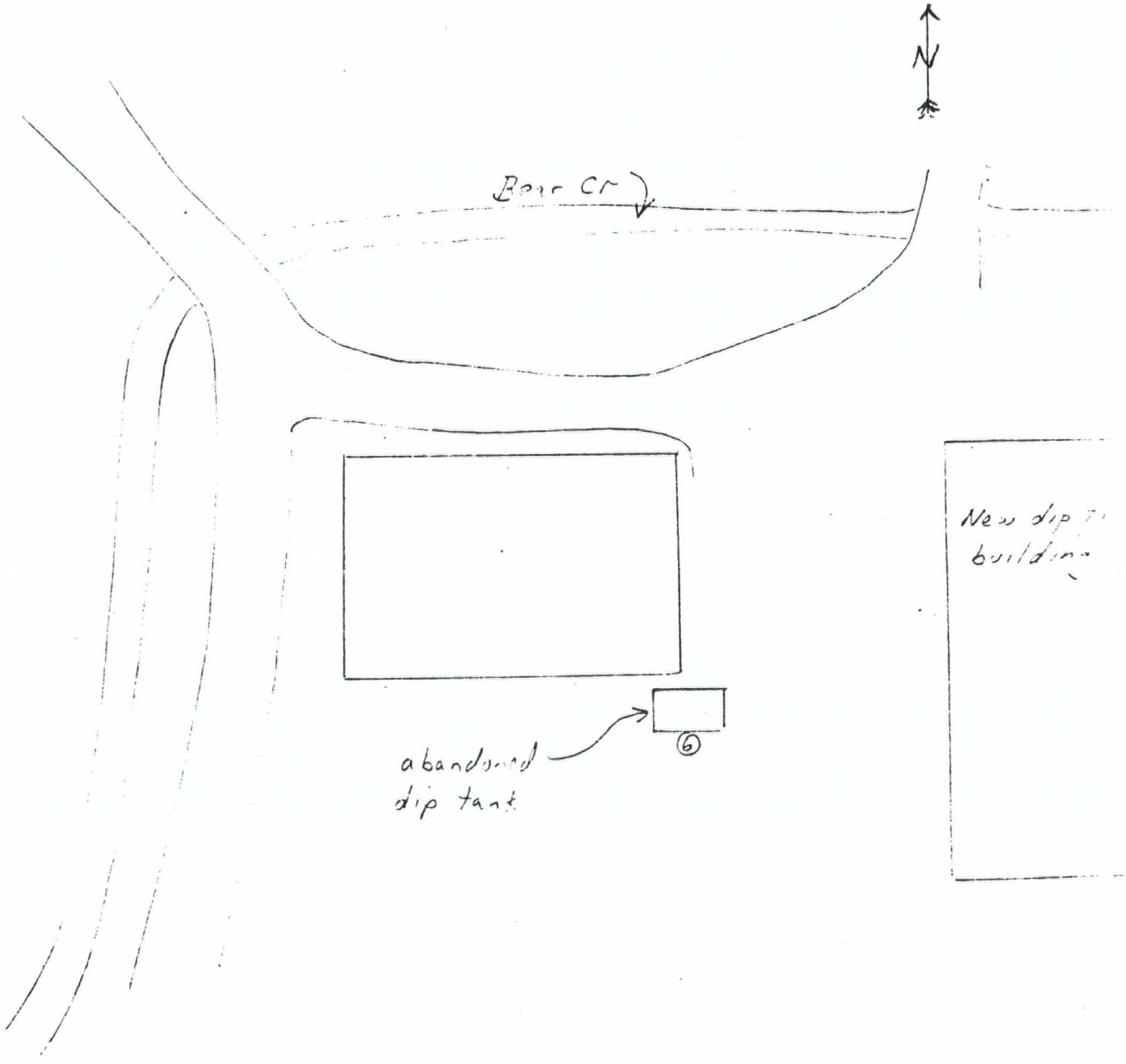
These sample results indicate limited degradation of PCP/TCP after up to three years in areas where there was major spillage of treating liquids, i.e. around dip tanks. The results would also indicate that PCP/TCP may still be considered a reasonable indicator of major past contamination from anti-fungicide operations. The impact of length of time since contamination and the magnitude of contamination on the quality of indicator needs further study. Additional samples will be taken at the above sites to further qualify PCP/TCP persistence in the environment.

Mill # 1

Sample Sites



#3 Rescue Mill
Sample Site



DEPARTMENT OF ENVIRONMENTAL QUALITY
Request for Analysis

Laboratory No. 84-0133

Location/Site: Avon LBR Date: 2/27/84

Collected By: JAB & RHE Program: WQ 3250I

Purpose: Field Check

Date Received Lab: FEB 27 1984

Date Reported: MAR 28 1984

Report Data To:

Comments:

* Basic (P) unpreserved; Nutrient (R) add H_2SO_4 in field; Metals (Tm) HNO_3 added in lab--don't rinse; Organic (X) mason jar — lab prepared

Item No.	Sampling Point Description (include time)	*Sample Container (bottle) #'s Nutrients Basic	DO BOD	Metals Organic		Test Required
1	Corner of Sawmill Building				E1	Parts Tetra
2	1" of Dirt over Concrete At Corner of old Dip Tank				E2	✓ ✓
3	Soil & ~~Dirt~~ Wood Waste Below Sucker N. End of old Dip Tank	*	1 Spd Milk		E3	✓
4	Behind Dip Tank (East Side)				E4	✓
5	Soil under Treated Lumber (Stockpile)				E5	✓
6	Pebbles under old Dip Tank	Rep SAME #3			E6	✓ ✓

Dept. of Environmental Quality
RECEIVED
MAR 30 1984
NORTHWEST REGION

Laboratory comments: Dave Samples

DATE: 28 MAR 84

LAB #: 84-0133
ITEM #: 1
SAMPLE: E1

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
10	PENTACHLOROPHENOL
5	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

DATE: 29 MAR 84

LAB #: 84-0133
ITEM #: 2
SAMPLE: E2

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
111	PENTACHLOROPHENOL
28	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

DATE: 28 MAR 84

LAB #: 84-0133
ITEM #: 3
SAMPLE: E3

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
4980	PENTACHLOROPHENOL
888	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

DATE: 28 MAR 84

LAB #: 84-0133
ITEM #: 4
SAMPLE: E4

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
<1	PENTACHLOROPHENOL
39	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

DATE: 28 MAR 84

LAB #: 84-0133
ITEM #: 5
SAMPLE: ES

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
98	PENTACHLOROPHENOL
195	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

DATE: 28 MAR 84

LAB #: 84-0133
ITEM #: 6
SAMPLE: E6

ACID EXTRACTABLES
METHOD 625

AMOUNT UG/G	PARAMETER
<1	PHENOL
<1	2-CHLOROPHENOL
<1	2-NITROPHENOL
<1	2,4-DIMETHYLPHENOL
<1	2,4-DICHLOROPHENOL
<1	4-CHLORO-3-METHYLPHENOL

AMOUNT UG/G	PARAMETER
<1	2,4,6-TRICHLOROPHENOL
<1	2,4-DINITROPHENOL
<1	4-NITROPHENOL
<1	2-METHYL-4,6-DINITROPHENOL
1400	PENTACHLOROPHENOL
1930	TETRACHLOROPHENOL **

** REPORTED AS
2,3,4,6-TETRACHLOROPHENOL

ATTACHMENT 9

SRI
Scientific Resources, Inc.

18 February 1987

Mr. James A. Broad
Department of Environmental Quality
811 S.W. 6th Avenue
Portland, Oregon 97204

WQ-Clack

RE: SRI PROJECT 8528: AVISON LUMBER COMPANY

Dear Jim:

Samples of water from three stations on Bear Creek at Molalla (see enclosed map) were collected January 29, 1987. Flow in Bear Creek at the Molalla Sewage Treatment Plant bridge was 17.5 cfs (see Table 1). Note that discharge values for the months of October through December in Table 1 have been changed from last month's Table 1 by a factor of 10. Tabled discharge values for those months were inadvertently not multiplied by the width of the weir at the Molalla Sewage Treatment Plant. Rainfall during the 5 days preceeding sampling was 2.14 in (see Table 1).

There was no 2,3,4,6-tetrachlorophenol or pentachlorophenol detected in any of the samples obtained. Detection limit for the samples was 0.18 ppb. These results have been included in Table 1 and cumulative results have been summarized at the end of the table. Values for pentachlorophenol and 2,3,4,6-tetrachlorophenol have also been graphed (Figures 1 and 2) for the period 9/25/85-1/29/87.

Cordially,

N. Stan Geiger, President
SCIENTIFIC RESOURCES, INC.

Encl.
cc: Bill Avison
Gordon Haver
Jim Benedict

Table 1. BEAR CREEK CHLOROPHENOL DATA

DATE	2,3,4,6 Tetrachlorophenol T SW1 ppb	T SW2 ppb	T SW3 ppb	Penta chlorophenol P SW1 ppb	P SW2 ppb	P SW3 ppb	DISCHARGE dnstm SW3 cfs	PRECEEDING 5-DAY PRECIP. in
14-Dec-83	11.13	17.30		4.94	4.73		27.9	
16-Jan-84	5.30	3.06		2.76	1.62		8.5	
15-Feb-84	2.97	2.20		1.33	1.03		21.7	
13-Mar-84	29.80	47.20		7.33	12.10		11.6	
17-Apr-84	1.52	0.96		1.06	0.74		10.4	
15-May-84	4.85	2.40		4.02	2.75		14.7	
19-Jun-84	0.76	0.53		0.93	0.65		3.1	
02-Aug-84	1.90	0.00		3.15	0.00		3.1	
29-Aug-84	1.30	0.00		2.20	0.00		0.8	
24-Sep-84							0.0	
26-Oct-84	9.63	5.81		3.63	4.15		3.1	
30-Nov-84	0.42	5.24		0.24	0.93		30.9	
02-Jan-85	0.55	0.27		0.84	0.48		19.3	
25-Jan-85	9.55	13.80		4.84	5.48		4.6	
28-Feb-85	0.41	0.00		0.79	0.68		4.8	
29-Mar-85	1.08	0.96		0.19	0.34		12.4	
02-May-85	0.35	0.00	0.00	0.71	0.50	0.39	3.1	0.20
30-May-85	3.31	11.78		0.39	6.64		0.8	0.43
21-Jun-85	0.51	0.00	0.00	0.68	0.34	1.13	0.8	0.00
01-Aug-85			4.95			13.90	0.0	1.72
08-Aug-85	17.30	8.47	0.00	17.80	9.71	3.69	1.7	0.26
28-Aug-85							0.0	0.00
25-Sep-85			0.00			0.34	0.0	0.00
30-Oct-85	14.00	0.45	0.38	29.50	1.75	0.00	5.2	0.68
06-Dec-85	0.83	1.71	1.60	2.76	3.59	4.62	30.8	1.62
26-Dec-85	0.42	0.26	0.20	0.59	0.28	0.24	1.1	
30-Jan-86	0.35	0.61	0.74	0.64	2.14	2.29	28.4	1.09
27-Feb-86	0.00	0.00	0.00	0.00	0.61	0.51	16.3	0.71
31-Mar-86	0.00	0.00	0.00	0.45	0.65	0.46	5.5	0.47
27-Apr-86	0.24	0.00	0.17	0.72	0.86	1.32	5.5	0.94
29-May-86	0.00	0.00	0.00	0.00	0.00	0.00	1.1	0.00
26-Jun-86	0.00	0.70	0.00	0.22	0.40	0.00	< 0.1	0.00
28-Jul-86	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00
26-Aug-86							0.0	0.00
30-Sep-86	1.65	2.01	0.00	10.00	6.10	0.60	< 0.01	0.78
30-Oct-86	2.41	2.66	1.30	19.20	19.80	5.89	0.9	0.95
24-Nov-86	0.00	1.61	2.96	0.87	1.50	3.70	28.0	3.53
30-Dec-86	0.00	0.00	0.00	0.00	0.00	0.00	18.7	1.54
29-Jan-87	0.00	0.00	0.00	0.00	0.00	0.00	17.5	2.14
COUNT	34	34	20	34	34	20		
MEAN (ppb)	3.60	3.82	0.62	3.61	2.66	1.95		
MINIMUM	0.00	0.00	0.00	0.00	0.00	0.00		
MAXIMUM	29.80	47.20	4.95	29.50	19.80	13.90		
SAMP. S.D.	6.37	8.76	1.27	6.47	4.20	3.32		

0.00 = not detectable; BLANKS = no sample obtained

Fig. 1. Pentachlorophenol in Bear Ck.

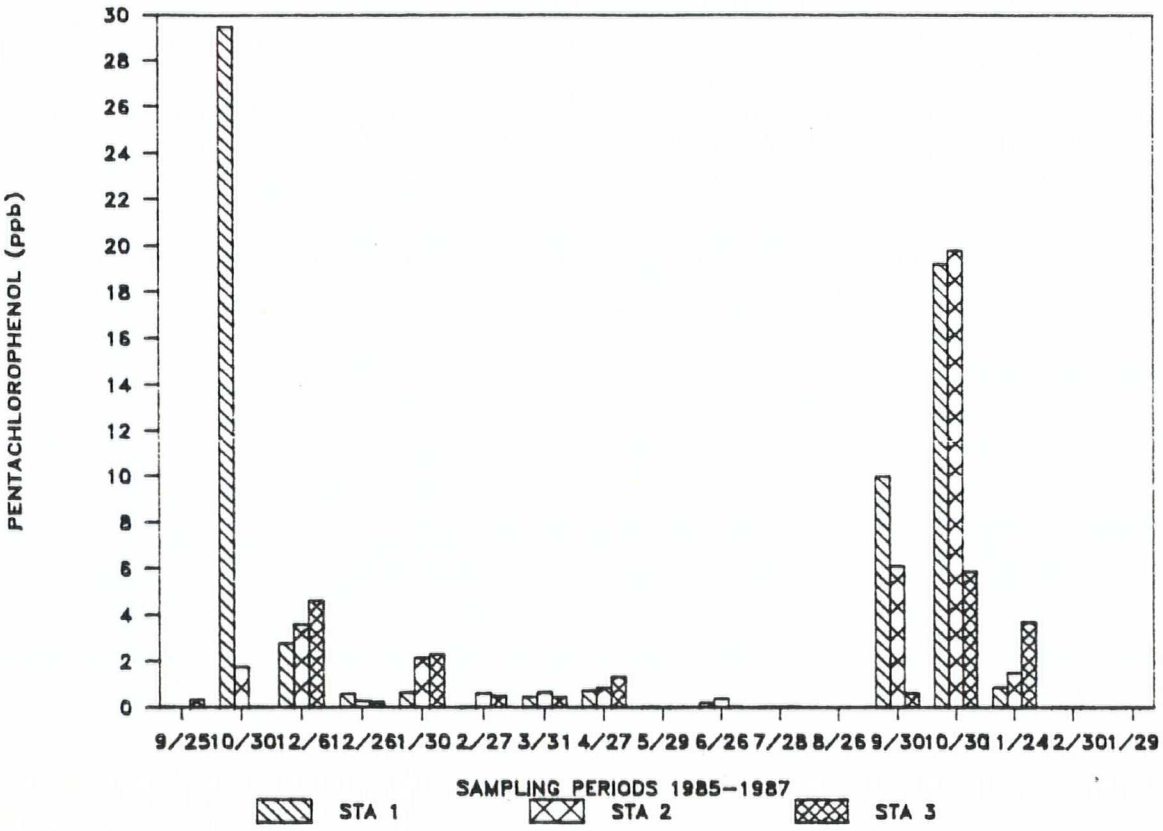
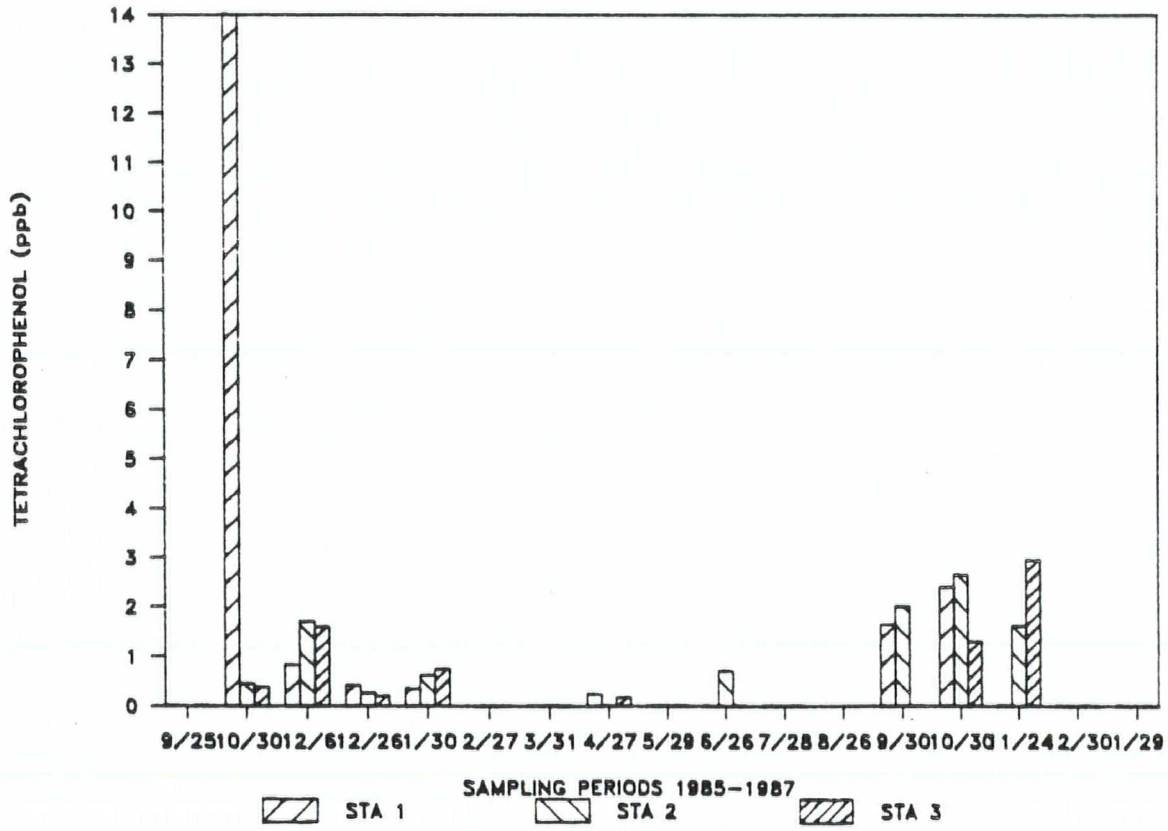
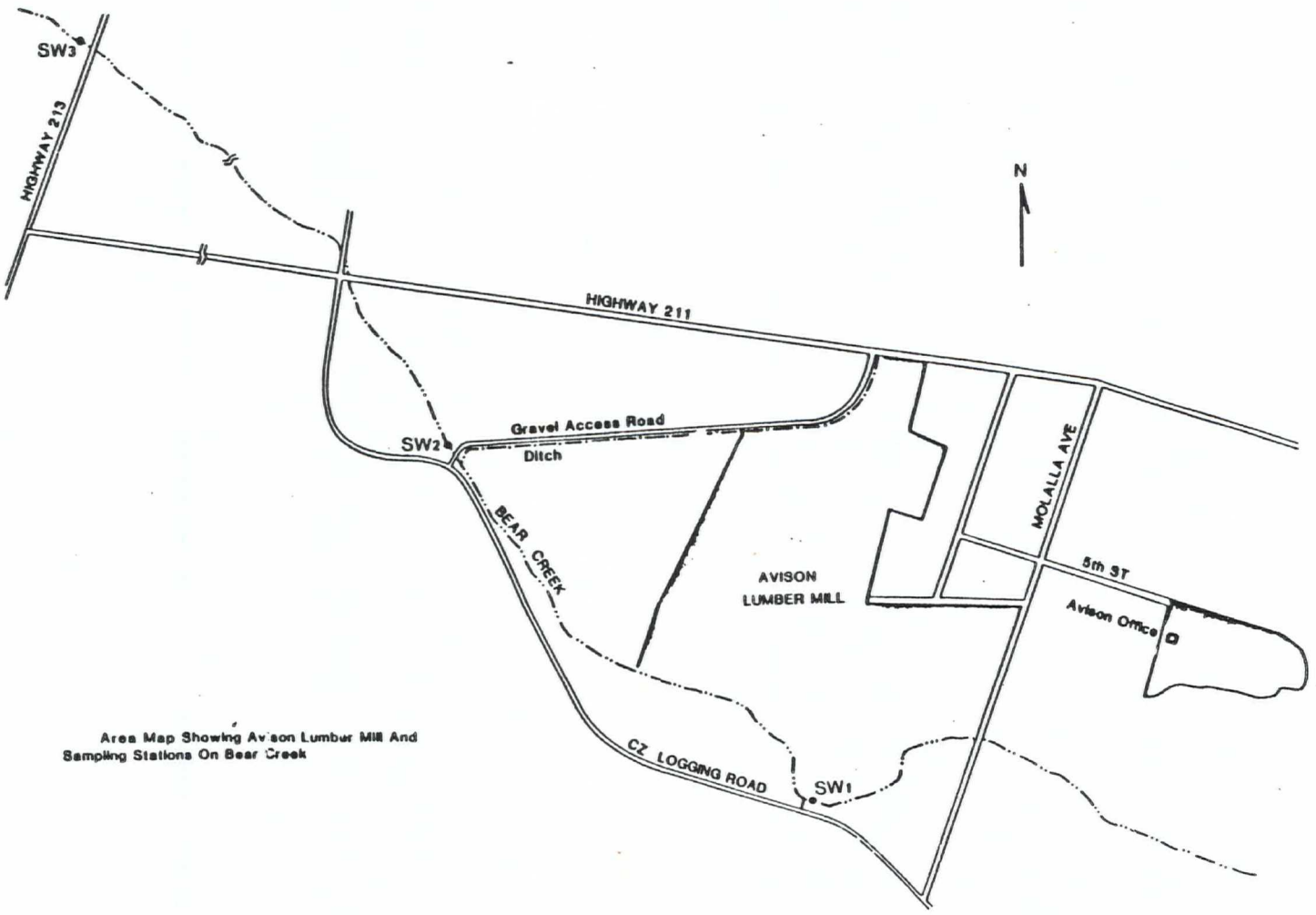


Fig. 2. Tetrachlorophenol in Bear Ck.



SCIENTIFIC RESOURCES, INC.



Area Map Showing Avison Lumber Mill And Sampling Stations On Bear Creek

AVISON LUMBER BEAR CREEK WATER QUALITY SAMPLING SITES

ATTACHMENT 10

1985 HW

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

DEC 11 1985

Partial Results (perimeter samples Gary only)

HW.7.20

State of Oregon
DEPARTMENT OF ENVIRONMENTAL QUALITY
RECEIVED
DEC 11 1985
WATER QUALITY CONTROL

REPLY TO
ATTN OF: M/S 337

Larry Patterson
Industrial Waste Engineer
Oregon Department of Environmental Quality
522 S.W. Fifth Avenue
Yeon Building
Portland, Oregon 97207

Larry,

Dear Mr. Patterson:

Please find attached the analytical data available for the two Molalla, Oregon chlorinated dibenzo-p-dioxin sites sampled earlier this year. These include the Avison Lumber and the Publisher's Paper sites. Also attached is a location key to the sample numbers and a brief description of the sampling methods utilized.

The data were all analyzed under contract by Cal Analytical Laboratories in Sacramento. Although we would all have preferred that each specific higher dioxin isomer be analyzed (and also the chlorinated phenols), funding constraints have necessitated that the analysis be specific only for the 2,3,7,8-tetra dioxin isomer, with the hexa, hepta, and octa dioxin isomers being identified only as total homologues for each class.

All data have been reviewed by our laboratory quality assurance chemists (see attached memoranda and data tables), and in general have been found valid for all purposes. The sole exception is Sample No. DJ008104, which does not meet the GC/MS ion ratio requirement for the total hexa isomers. Initial review by in-house staff indicates that the levels of dioxin(s) at the various sampling sites appear relatively low. Nonetheless, we still plan to subject the data to further formalized risk assessment.

As you know, I am coordinating this effort for our Environmental Services Division, and we are working closely with Lori Cohen of our Superfund Branch. We are planning to have a risk assessment meeting to discuss these data in the near future. I will be technical leader for the assessment, and would very much like to have you with us at our meeting. The specifics for the meeting have yet to be determined, but we will be in touch with you shortly to set something up, probably in Seattle. We look forward to seeing you soon, and thank you for your patience in awaiting these results.

Yours sincerely: Michael Watson

Michael Watson, Ph.D.
Regional Toxicologist

attachments

SAMPLING METHODS - PUBLISHERS PAPER & AVISON LUMBER, MOLALLA, OREGON

PUBLISHERS PAPER

Stations - 9, 16, 15, 12, 10, 11, 14

Shovel used to expose soil within approximate 12" diameter hole. Representative soil clumps were placed into a stainless steel bucket. The soil was then mixed thoroughly using a clean metal scoop. Soil was then placed into sample jars using the metal scoop.

Station 17 -- Perimiter site -- Soil between railroad tracks South of Mill

Metal scoop used to obtain largely soil from four to five locations along a 6-10 Ft section of Railroad tracks. Soil placed into stainless steel bucket, mixed and placed into sample jars.

AVISON LUMBER, MOLALLA

Station 12c Soil from 3 foot depth level at Old Antistain Lumber Storage Area

Backhoe used to excavate down through approximately 3 feet of gravel. Soil from the three foot depth level was placed into a stainless steel bucket using the shovel. The soil was then mixed thoroughlly using a clean metal scoop. Soil was then placed into sample jars using the metal scoop.

Station 14A - Surface composite from antistain lumber storage area
14B - Composite from 2 ft depth at same location
14C - Composite from 3 ft depth at same location

Backhoe used to excavate and expose soil. Soil from each level was placed into a stainless steel bucket using a clean metal scoop. The soil was then mixed thoroughlly using the scoop and placed into sample jars.

Station 17 - Perimeter site

Scoop used to collect soil from 7-8 locations within an approximate 10-15 foot radius in vicinity of a utility pole. Soil was placed into a stainless steel bucket, mixed thoroughlly and then placed into sample jars.

Station 13 - Soil Just NW of Chain Haul Road Bridge

Shovel used to expose soil within approximate 12" diameter hole. Representative soil clumps were placed into a stainless steel bucket. The soil was then mixed thoroughlly using a clean metal scoop and placed into sample jars.

Station 10 Near Drainpipe Upstream of Conveyor

Shovel used to collect soil from four to five locations within an approximate 30 ft stretch of drain ditch downstream of the discharge end of a pipe which drains surface runoff from a paved antistain lumber storage area. Soil from each spot was placed into a stainless steel bucket and mixed thoroughlly using a clean metal scoop and placed into sample jars.

Station 18,16 Perimiter Site South of Bear Creek West of New Antistain Facility

Shovel used to expose soil within approximate 12" diameter hole. Representative soil clumps were placed into a stainless steel bucket. The soil was then mixed thoroughlly using a clean metal scoop and was then placed into sample jars.

Station 7 North Drainage Ditch

Scoop used to collect soil from 3-4 locations along an approximate 30ft stretch of drainage ditch. Soil was placed into a stainless steel bucket, mixed thoroughlly using a clean metal scoop and then placed into sample jars.

Station 7A North Drainage Ditch

Shovel used to collect soil from 5-6 locations along an approximate 100 Ft stretch of drainage ditch. Soil was placed into a stainless steel bucket, mixed thoroughlly using a clean metal scoop and then placed into sample jars using the metal scoop.

LOCATION KEY TO SAMPLE NUMBERS, PUBLISHER'S SITE (SAS CASE #1781J/4659)

Sample No.	Station No.	Site Description (approximate)
DJ008102	9	soil, perimeter site SW of log yard
103	16	soil, field N of mill
104	15	soil, 150' S of company office
105	17	soil, between RR tracks, S of mill
106	10	soil, perimeter of log yard, W of mill
107	12	soil, perimeter site, back yard company house
108	6	sediment, central drain ditch, NW of mill
109	4	sediment, central drain ditch, near office
110	5	sediment, central drain ditch, vic. oil skimmer
111	13	groundwater, company house well, S of mill
112	11	soil, perimeter site W of log yard
113	14	soil, back yard company house, NE corner mill

LOCATION KEY TO SAMPLE NUMBERS, AVISON SITE (SAS CASE #1780J/4658)

Sample No.	Station No.	Site Description (approximate)
DJ008001	17	soil/sawdust across residential area NE of mill
002	3A	sediment, Bear Cr at Mathias Rd
003	4	sediment, Bear Cr at Wilhoit Rd
004	13	soil, NE of Chain Haul Rd Bridge
005	10	sediment, drain ditch upstream of conveyor
006	18	soil, S new antistain facility, S border mill
007	16	soil, perimeter logyard site, NW side of mill
008	7	sediment, N drainage ditch, nr mill entrance
009	7A	sediment, N drainage ditch, E of Main Haul Rd
010	5	sediment, Bear Cr, below Main Haul Bridge
011	6	sediment, Bear Cr, below confluence of W Ditch
012	8	sediment, W Ditch below confluence w N Ditch
013	9	sediment, W Ditch upstream confl w N Ditch

17910

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
Manchester, Washington 98353

REPLY TO ATTN OF: M/S Lab

November 26, 1985

MEMORANDUM

SUBJECT: Data Review of Dioxin SAS 1780J/4658

RECEIVED
NOV 29 1985
ENVIRONMENTAL SERVICES DIVISION

FROM: Gerald Muth
Chemist, ESD

TO: Mike Watson
Toxicologist, ESD

The Dioxin SAS Case #1780J/4658 has been reviewed by Jim Farr and myself. I have found the data to be valid for all purposes. This opinion is based on the following observations.

Matix spike recovery	-	Acceptable
Method Blank	-	Acceptable
Duplicate analysis	-	Acceptable
Sample analysis	-	Acceptable (Several samples showed no responses which suggests no laboratory contamination)
GC/MS ION ratios	-	Acceptable
PE Sample	-	Although the recovery values were outside of acceptable limits for the hepta and octa-CDD, the EMSL/LV PE sample has not been established as authentic due to the lack of realiable standards.

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AVISON SITE

ng/g - (PPB)

Analysis Date 8/1/85

Sample #		1234+ 2378-TCDD	Total hexa	Total hepta	Total octa
DJ008001		ND	18.5	95.7	173
DJ008001	Dup	ND	12.1	61.0	170
DJ008002		ND	ND	ND	ND
DJ008003		ND	4.6	13.6	21.3
DJ008004		ND	10.4	22.6	38.5
DJ008005		ND	89.2	378	440
DJ008006		ND	ND	ND	ND
DJ008007		ND	ND	ND	ND
DJ008008		ND	4.2	11.4	23.9
DJ008009		ND	.48	1.9	4.1
DJ008010		ND	12.7	40.7	60.1
DJ008011		ND	5.0	23.8	73.8
DJ009012		ND	.19	.89	3.6
DJ008013		ND	ND	ND	ND
DJ008014					
DJ008014	Spiked	1.00(1.0)	1.17(1.0)	.94(1.0)	5.13(5.0)
% recovery		(100%)	(117%)	(94%)	(103%)
DJ008015		5.2	5.2	12.8	263
DJ008016		5.6	5.0	12.0	204
Method Blank		ND(.0072)	ND(.14)	ND(.025)	ND(.20)

4 1914

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
Manchester, Washington 98353

REPLY TO ATTN OF: M/S Lab

November 26, 1985

MEMORANDUM

SUBJECT: Data Review of Dioxin SAS 1781J/4659

FROM: Gerald Muth
Chemist, ESD (Manchester Lab)

TO: Mike Watson
Toxicologist, ESD

The Dioxin SAS Case #1781J/4659 has been reviewed by Jim Farr, Region 10, EPA; Larry Butler, EPA, EMSL-LV; and myself. We agree that the data for 2,3,7,8 - TCDD and Total Hexa-CDD are valid for all purposes ~~with the exception noted for BJ008104~~.

The data for total hepta and octa-CDD are considered questionable. However they should represent the maximum approximate levels that may be present in the samples. The reasoning is as follows:

1. The lowest recoveries were 113% for Octa-CDD and 120% for hepta-CDD and ranged upward to 1760 and 940% respectively.

2. The respective response factors for each hepta and octa-CDD to the internal standard showed both good sensitivity and precision.

3. The laboratory had no trouble observing low level hepta and octa-CDD contamination introduced by the laboratory.

4. These documented quantative errors would tend to produce exagerted and falsely positive values.

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PUBLISHER'S SITE

ng/g - (PPB) Analysis Date 7/23/85

Sample #		2378-TCDD	Total hexa	Total hepta	Total octa
DJ008102		ND	ND	ND	ND
DJ008102	Dup	ND	ND	ND	ND
DJ008103		ND	1.2	8.1	19
DJ008104		ND	(.21)	3.1	8.2
DJ008105		ND	ND	3.5	8.0
DJ008106		ND	ND	(48)	1.3
DJ008107		ND	ND	(51)	1.5
DJ008108		ND	ND	(2.0)	4.0
DJ008109		ND	ND	ND	ND
DJ008110		ND	ND	(1.9)	3.1
DJ008111		ND	ND	ND	ND
DJ008111	Dup	ND	ND	ND	ND
DJ008112		ND	ND	ND	ND
DJ008113		ND	ND	ND	ND
DJ008114	Spike	1.01	(1.21)	16.18	86.69
Recovery		(103%)	(122%)	(940%)	(1760%)
DJ008115	Spike	6.8 (8.0)	4.2 (5.2)	48 (39)	382 (100)
Recovery		(85%)	(81%)	(123%)	(382%)
DJ008116		7.9	4.5	54	348
DJ008117	Spike	31.28	31.95	34.42	162
Recovery		(109%)	(112%)	(120%)	(113%)
Method Blank (S6479MB)		ND	ND	1.9	9.4
Method Blank (S6470MBRI)		ND(.0024)	ND(.0078)	ND(.051)	ND(.20)

Note: The circled values did not meet basic GC/MS Ion-ratio requirement. They are due partially or entirely to substances other than those.

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AVISON

SITE	No.	ppb 2,3,7,8 TCDD	HEX-CDD	WORST CASE x0.04	HEP-CDD	WORST CASE x0.001	OCDD	WORST CASE x 0	2,3,7,8 EQUIV	mg/kg PCP	TECP
SURFACE DEBRIS NEAR UTILITY	8001										
POLE N. OF PLANT	#17	N.D.	18.5	0.74	95.7	0.0957	173	-	0.8357	<5	<5
SEDIMENT FROM BEAR CR (U.S) @ MATHIES RD	8002 #3A	"	ND	-	ND	-	ND	-	-	<0.5	<0.5
SEDIMENT FROM BEAR CR BETWEEN MILLS	8003 #4	"	4.6	0.184	13.6	0.0136	21.3	-	0.1976	<0.5	<0.5
MUD/SEDIMENT FROM MILL DRAIN EXIT AREA	8005 #10	"	89.2	3.568	378	0.378	440	-	3.946	3	19
SOIL S. OF FOCAL DEBRIS FROM	8006 #18	"	ND	-	ND	-	ND	-	-	<0.5	<0.5
WEST LOG YARD	8007 #16	"	ND	-	ND	-	ND	-	-	<5	<5
SOIL IN N. DITCH NEAR MILL	8008 #7	"	4.2	0.168	11.4	0.0114	23.9	-	0.1794	<0.5	<0.5
SOIL IN N. DITCH AWAY FROM MILL	8009 #7A	"	0.98	0.0192	1.9	0.0019	4.1	-	0.0211	<0.5	<0.5
SEDIMENT IN BEAR CR @ MILL	8010 #5	"	12.7	0.508	40.7	0.0407	60.1	-	0.548	<1	<1
SEDIMENT IN BEAR CR (D.S.) @ COUNTY ROAD BRIDGE	8011 #6A	"	5.0	0.20	23.8	0.0238	73.8	-	0.2238	0.9	1.0
SOIL IN GOSSO DITCH BACKGROUND SOIL ABOVE	8012 #8	"	0.19	0.0007	0.89	0.00089	3.6	-	0.00159	<0.5	<0.5
GOSSO DITCH SOIL ADJACENT TO	8013 #9	"	ND	-	ND	-	ND	-	-	<0.5	<0.5
MILL HAUL ROAD	8014 13	"	10.4	0.416	22.6	0.0226	58.5	-	0.4386	<5	<5

Avison Lumber Co.

Dioxin and PCP/TCP data for 1985 EPA dioxin study.

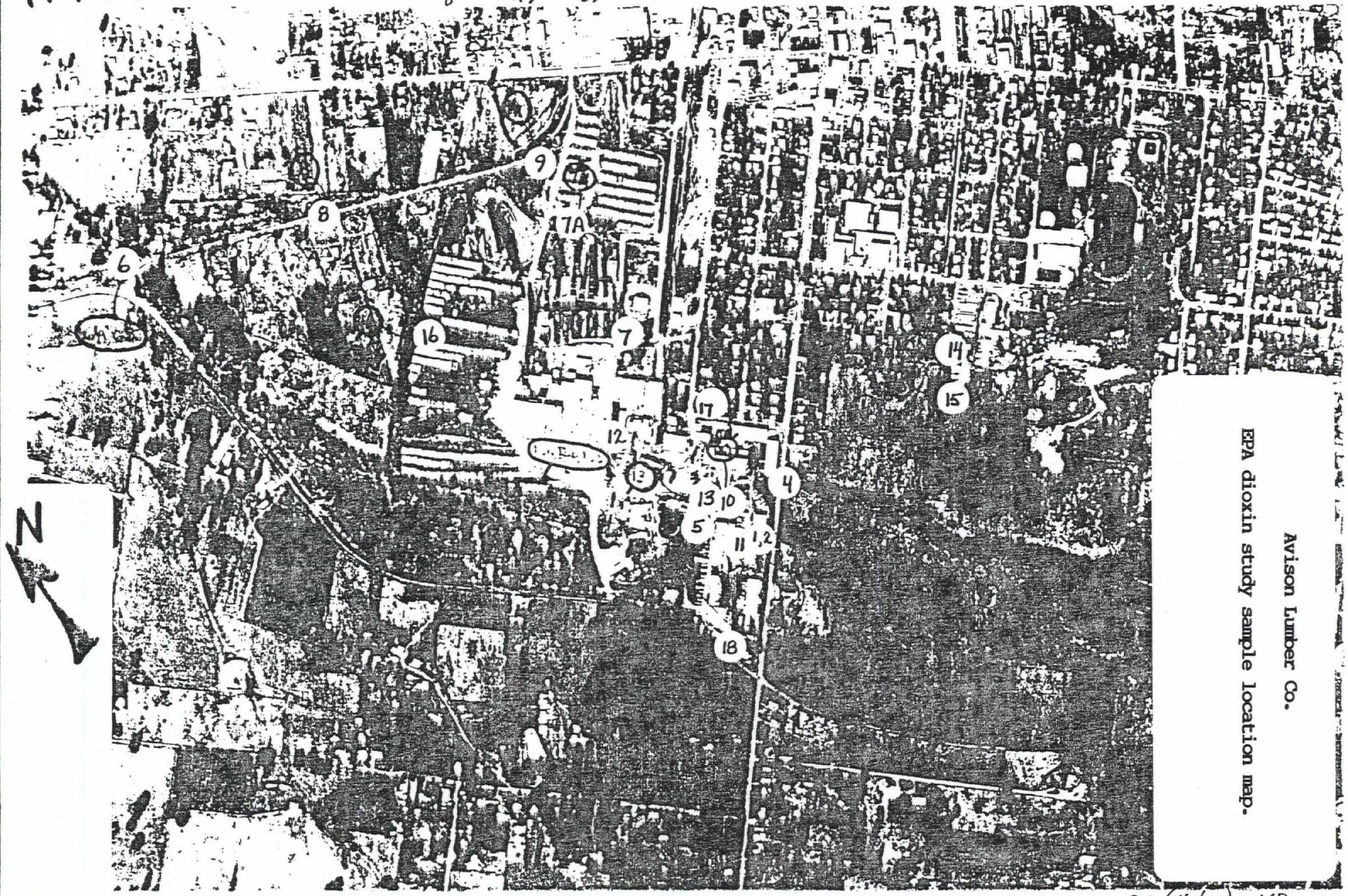
STA [redacted] – ND

STA # 16 – ND

# 7	4.2	11.4	23.9
7A	.48	1.9	4.1
5	12.7	40.7	60.1
6A	5.0	23.8	73.8
8	.19	.89	3.6

STA # 17	HEXA	HEPTA	OCTA
	18.5	96.7	[redacted]
4	4.6	13.6	21.3
13	10.4	22.6	38.5
10	89.2	378	440

AVISON



Avison Lumber Co.

EPA dioxin study sample location map.

STA # 18 – ND

3A (Water) ND

ATTACHMENT 11

REPORT
OF THE FINDINGS OF
A HOUSEHOLD HEALTH SURVEY
CONDUCTED IN
THE MOLALLA/LIBERAL AREA

May, 1985

MICHAEL HEUMANN, M.P.H.
OFFICE OF HEALTH STATUS MONITORING
OREGON STATE HEALTH DIVISION

In response to a request from the Oregon Department of Environmental Quality to look into unexplained complaints of human and animal illness in the Molalla/Liberal area, the Oregon State Health Division designed and implemented a household health survey to measure the extent of the health problems in the community. Reports of health problems affecting animals and humans have come from people who live near lumber mills. Community residents have reported a range of symptoms, including skin disorders, headaches, disorientation and respiratory problems. Some area residents suspect the cause of the illnesses to be pentachlorophenol (PCP), a wood preservative used by lumber mills throughout Oregon and the United States, to control fungi that discolor wood.

Health problems affecting cows, horses, chickens and pond fish have been reported. There are at least two households where people alleged symptoms of illness. In one case of human symptoms PCP was detected in small amounts in the well used for drinking water. The well was located down gradient from an area of a mill which was used to dispose of sludge contaminated with PCP. In another case where both human and animal health effects were reported a separate source of PCP exposure was identified. However, this source of contamination was not associated with the nearby lumber mill.

Over a period of several months, Department of Environmental Quality conducted a variety of air, soil and water studies in an attempt to characterize possible environmental contamination of areas surrounding the lumber mills in the Molalla/Liberal area. Their studies were unable to demonstrate any measurable off-migration of PCP from the mills into the neighboring communities.

In an effort to assess the extent of the problems among residents and their animals, the Health Division conducted a survey in communities around three lumber mills in the Molalla/Liberal area. This area is located about 35 miles south of Portland. There are three lumber mills located within approximately four miles of each other. One of the mills is located in the town of Molalla. The town has an approximate population of 3,000 people. The remaining mills are located in sparsely populated rural areas to the north of Molalla. One area is called Liberal, and the other is unnamed. We have designated it as the Brazier area for purposes of this study.

A nearby community - Beavercreek - was selected as a control population. Beavercreek is a rural community located about 10 miles north of Molalla. It has a population density in between that of Molalla and the Liberal-Brazier areas. There is no lumber mill within at least 5 miles of this community.

STUDY DESIGN AND METHODOLOGY

In order to measure any possible pattern of health effects among people and animals which might be related to the lumber mills, a study design was developed which included only those homes situated in close proximity to the mill sites.

A statistically random sample of 72 households was drawn for inclusion in the survey. Eighteen households were selected from each of the study communities (Molalla, Liberal and the Brazier Mill area), and from the control community (Beavercreek). Twelve of the households were selected from within a half-mile radius around each lumber mill. The remaining six households in each of the study communities were drawn from a one-half to one-mile radius around the mills.

Information was gathered on all family members who reside in each home. Surveys were completed in a face-to-face interview. Interviews were conducted by seven nursing students who are in their fourth year of training at the Walla Walla College School of Nursing in Portland. The interviewers received nine hours of training in interview methodologies by Health Division staff, and they tested the questionnaire prior to actual implementation.

A series of 33 questions was asked for each member of the household (see questionnaire in Appendix). Information was gathered on basic demographic and other characteristics, including length of residence in the community, occupation, source of drinking water, and smoking history (among persons aged 16 years and older). A series of open-ended questions was asked to gather information about current medical problems and whether a physician was consulted. This was followed by a series of 13 questions regarding specific medical conditions which may have been experienced during the past two years. For each condition, respondents were asked if they had seen a physician for the problem. Finally, a series of questions was asked concerning the health of animals, including both farm animals and household pets.

In addition to the information gathered from the questionnaire, drinking water was analyzed from a sub-sample of nine homes (five from the study area and four from the control community). The wells at each lumber mill were also tested. Water from all wells was analyzed for twelve phenolic compounds (including pentachlorophenol and tetrachlorophenol) and arsenic. All of the samples results were below the detectable limits for both arsenic and the phenolic compounds (the detection limits were 0.005 milligrams/liter and 0.001 milligrams/liter, respectively). For further information on the water sampling please see a separate

report entitled "Results of Drinking Water Sampling from the Molalla/Liberal Area" (available from the Oregon State Health Division).

RESULTS

Nine of the 72 households were excluded from analysis. Seven were excluded because the families did not reside in the study communities for the entire two-year period preceding the survey (this is the time period for which information was sought in relation to exposure). Five of these households were located in the town of Molalla. This is not an unexpected finding since Molalla is the more urban of the study communities, and would likely experience a greater amount of influx than the rural areas. The two remaining households which were excluded were located in the control community. The family in one house had entered the control community within the last year from one of the study communities. The other household was excluded from analysis because the residents declined to answer basic demographic questions.

Information was analyzed on 188 people residing in 63 households (83.0% response rate). The average household size was approximately three persons (see Table 1). The range of household size was one to nine persons. Molalla had the smallest average family size (2.15 persons) and Liberal had the largest family size (3.47 persons). Age characteristics of the sample populations in each community were more varied than expected. They differed from each other as well as from the figures reported in the 1980 Census. Table 2 shows the median age for each area. The sample populations from each of the three study areas were significantly older than the sample population in the control community. Also, the median age for the study communities was consistently higher than that reported in the 1980 Census. On the other hand, the median age in Beavercreek was below that of the 1980 Census. This difference is explained, in part, by a general out-migration from the entire Molalla area. According to officials of the Molalla School District, there has been a sizeable decline in school enrollment since approximately 1980. In response to the economic downturn in the lumber industry, younger families may have moved away. At the same time, Beavercreek has experienced a recent influx of families with young children. This was confirmed by representatives of Beavercreek School, who explained that the community's proximity to Oregon City and Milwaukie has attracted the new residents.

Differences in median age between the study and control communities may also be related to the fact that sampling in the study areas was based on proximity to the mills. Thus, the sample may not be representative of the larger surrounding community. It is, however, representative of

the people who live near the lumber mills. The sample from Beavercreek is representative of the entire community.

In examining illness information, it should be remembered that the accuracy of the data is limited by memory recall over the two-year period. Therefore, it was decided to concentrate on those conditions for which a physician had been consulted. It is believed that there would be a greater recall for more serious conditions (such as those requiring a doctor's attention) as opposed to more minor ailments which can be relieved or endured without seeing a doctor. In looking for possible associations with a potential environmental contaminant, the types of symptoms or problems most likely to be related to low level toxic exposure were examined. For the purpose of this study, such conditions include general allergies, skin conditions, recurrent infections, eye irritation, nose/throat problems, lung problems, liver and kidney ailments, nervous disorders, and lymph system problems. Excluded from this category of analysis are conditions such as heart disease, high blood pressure, back problems, arthritis, and diabetes. Also excluded were allergies to specific known and un-related sources such as bee stings or milk.

Table 3 presents the findings for health problems possibly related to an environmental contaminant and for which a physician was consulted. There were no observable differences in the prevalence of illnesses reported between the study population and controls. The rates of illness reported for Molalla and the control community, Beavercreek, were virtually identical. The small difference in rates for Liberal and Brazier compared to Beavercreek was not significant. The possible influence of age differences among communities was analyzed. No difference in illness prevalence rates was observed for the data when age was controlled.

The household health survey also examined all self-reported illnesses by area (Table 4) as a measure of perceived health status. Respondents in Liberal and Brazier had the highest rate of self-reported health problems (66% of the population). In contrast, people in Molalla and Beavercreek reported lower rates (50% and 45%, respectively). The difference in rates of perceived illness between the study communities of Liberal and Brazier compared to Beavercreek were statistically significant. The significance remained even after the data were adjusted for the age differences.

Findings on the animal data are summarized on Table 6. Molalla had the fewest number and variety of animals. Having only domestic pets reflects the more urban nature of Molalla. Liberal and Brazier had the greatest variety and amount of animals. The animals included both farm animals and domestic pets. The number and variety of animals present in

Beavercreek was intermediate to Molalla and Liberal/Brazier. People in Beavercreek have mostly dogs, cats and horses.

There was no pattern of illness or death among animals in Molalla, Brazier or Beavercreek. Causes of death, where known, did not seem to be associated with an environmental contaminant. The data for Liberal did show an unusually large number of illnesses and deaths among animals. However, a single residence accounted for all the deaths reported for dogs, cats and horses, along with all horse illnesses. It was also determined that the animals at this household were exposed to pentachlorophenol from a known source other than the neighboring mill. The remaining animal deaths (13 sheep) occurred on one farm. The farmer was not aware of the cause of death.

DISCUSSION

While unexpected differences in age distribution were identified in all communities, this finding did not seem to influence the rate of illness for which a physician was consulted for a health problem that was possibly related to an environmental contaminant (Table 3). Differences in age distribution did affect the rate for all self-reported health problems (Table 4). The rates which were influenced by the age differences were affected in a predictable pattern or direction - they increased. In general, older persons suffer from more health problems (especially chronic problems such as arthritis and heart conditions) and can be expected to have a greater number of physician visits than younger adults.

The principle finding of this study was that there was no observable difference in the prevalence rate of reported health problems possibly related to exposure to a toxic substance and which received medical attention (Table 3). Medical consultation was the key delimiting factor in the analysis. It is assumed that people will be more likely to reliably remember a serious health problem, necessitating a visit to the doctor, than the minor aches and pains they generally deal with on their own. It is further expected that a minor health problem that persists for some time, and does not respond to self-care, will result in a medical visit at some point.

Difference in illness rates between cases for which a physician was consulted for a health problem possibly related to an environmental contaminant (Table 3) and all cases of self-reported health problems (Table 4) was greatest for the Liberal and Brazier areas. These are the areas with the longest history of concern about and reported problems of contamination associated with the lumber mills. The rural population in

these areas has likely been sensitized to the issues regarding pentachlorophenol and the local lumber mills. So, it is not surprising to find a high rate of self-reported problems which would correspond to a higher rate of perceived ill health among residents. There has been a good deal of concern about suspected problems involving animal and human health, as well as attention from the media. It is, therefore, not unexpected to see a higher rate of self-perceived ill health among residents of these communities when compared with areas which do not have a similar history.

If there is any difference shown in this study, it is in the perception of health status rather than in actual health status as it is estimated here. This does not mean that there are no health problems associated with the lumber mills. It only means that such a relationship has not been demonstrated in this study. Concern about potential health problems can result in real symptoms. Also, it must be remembered that this type of study is limited by the memory recall of participants and by the sample size.

A more appropriate place to look for potential health effects from exposure to chlorophenolic wood preservatives would be to study the workers at the mills. These individuals, who are at greater risk of exposure over time, would be more likely to demonstrate any related health problems. It would be expected that health problems would show up among workers before they would be seen among people in the surrounding commmunity.

Similar to the human health findings, there was no association observed in animal ill health or death and proximity to lumber mills. The only exception to this was an unusually high occurrence of animal illness and death at one household in Liberal. It has been determined that a separate source of exposure was present on the farm. Wood chips contaminated with pentachlorophenol were purchased by the owners from a source outside of the community and used for animal bedding. Tests conducted at this site by the Department of Environmental Quality and two private laboratories demonstrated elevated levels of pentachlorophenol only in relation to the contaminated wood chips.

RECOMMENDATIONS

Based on the findings of this community-based household survey in the Molalla/Liberal area, no association between living near a lumber mill which uses pentachlorophenol and human or animal health problems was observed. Despite the small study size and possible limitations of participant memory recall, we would expect to see a relationship if one was present. This study gives no reason to suspect that living in

proximity to a lumber mill is linked to increased health risk from pentachlorophenol. No further human health evaluation in the general population is recommended, at this time. However, as we learn more about chemicals like pentachlorophenol and its by-products, it may be advisable to conduct additional human health investigations; perhaps among lumber mill workers. In order to assess future health trends, it is recommended that some form of routine surveillance of mill workers be considered.

While no systematic contamination from the lumber mills could be confirmed either via environmental monitoring by DEQ or through the household health survey by the Health Division, we are aware of another source of exposure - contaminated wood chips. This is most significant among animals which have been exposed to the wood chips as bedding material. There may be some possible risk for humans handling the wood chips for prolonged periods. As the next step to assess the possible effects of exposure to contaminated wood chips, the Health Division will design a survey to be carried out in cooperation with other agencies to assess the health of animals on farms which used the contaminated bedding material.

Table 1

Population Totals and Average Household Size, by Area

Molalla /Liberal Household Health Survey

Area	Total Population	Total Households	Average Number of Persons per Household
Molalla	28	13	2.15
Liberal	59	17	3.47
Brazier	50	17	2.94
Beaver Creek	51	16	3.19
Total	188	63	2.98

Table 2

Comparison of Median Age

Between Sample Population and 1980 Census Data

Molalla/Liberal Household Health Survey

	Median Age in Years	
Area	Sample Population	1980 Census
Molalla	45*	28
Liberal	40*	32**
Brazier	35*	32**
Beavercreek	23	27

*sample population designed to be representative of the area surrounding the lumber mills rather than the entire community

**estimated values

Table 3

CASES WHERE A PHYSICIAN WAS CONSULTED FOR A HEALTH PROBLEM

POSSIBLY RELATED TO AN ENVIRONMENTAL CONTAMINANT*

MOLALLA/LIBERAL HOUSEHOLD HEALTH SURVEY

AREA	TOTAL POPULATION	NUMBER WHO SAW MD FOR HEALTH PROBLEM	PERCENT OF TOTAL
Molalla	28	6	21.4
Liberal	59	15	25.4
Brazier	50	12	24.0
Beaver Creek	51	11	21.6
TOTAL	188	44	23.4

* Allergies, skin conditions, recurrent infections, eye irritation, nose/throat problems, lung problems, liver conditions, kidney ailments, nervous disorders, lymph problems

Table 4

Self-Reported Health Problems By Area

Molalla/Liberal Household Health Survey

Area	Total Population	Persons Reporting An Illness	Percent Of Total
Molalla	28	14	50.0
Liberal	59	39	66.1
Brazier	50	33	66.0
Beavercreek	51	23	45.1
Total	188	109	58.0

Table 5

Total Number of Animals Present and Cases of Animal Illness and Death Reported By Area

Molalla/Liberal Household Health Survey

Animals	Molalla			Liberal			Brazier			Beavercreek		
	Total	Number Ill	Number Died*	Total	Number Ill	Number Died*	Total	Number Ill	Number Died*	Total	Number Ill	Number Died*
Dogs	5	0	0	32	1	1**	21	2	1	40	0	1
Cats	6	0	5	63	1	36**	51	0	2	23	0	1
Horses	-	-	-	26	12**	5**	11	0	0	11	0	0
Sheep	-	-	-	140	0	13	190	0	0	-	-	-
Cows	-	-	-	32	0	0	31	2	1	-	-	-
Pigs	-	-	-	-	-	-	11	0	5	-	-	-
Fowl	-	-	-	128	0	0	233	0	7	3	0	0
Other	-	-	-	4	0	0	12	0	1	3	0	0

*animal deaths excluded traumatic causes, poisonings, old age and slaughter for food.

**all these cases of animal illness and death occurred on a single farm which had an identifiable source of contamination not related to the nearby lumber mill. See text for further explanation.

APPENDIX

Questionnaire for

Household Health Survey

HEALTH SURVEY IN MOLALLA AREA

HOUSEHOLD ROSTER

HOUSEHOLD CODE _____ INTERVIEWER INITIALS _____

DATE __ __/__ __/__ __

ADDRESS OF HOME _____

_____

PHONE _____

HOW MANY PERSONS HAVE LIVED IN THIS HOUSEHOLD DURING THE LAST 2 YEARS? __ __

HOW MANY OF THESE PERSONS ARE CURRENTLY ALIVE? __ __

HOW MANY HAVE PASSED AWAY DURING THE LAST 2 YEARS? __ __

	NAME	SEX	AGE	ALIVE		DATE DIED	CAUSE	DATE COMPLETED
1	_____	M F	___	Y	N	____	_____	_____
2	_____	M F	___	Y	N	____	_____	_____
3	_____	M F	___	Y	N	____	_____	_____
4	_____	M F	___	Y	N	____	_____	_____
5	_____	M F	___	Y	N	____	_____	_____
6	_____	M F	___	Y	N	____	_____	_____
7	_____	M F	___	Y	N	____	_____	_____
8	_____	M F	___	Y	N	____	_____	_____
9	_____	M F	___	Y	N	____	_____	_____

WHAT IS THE SOURCE OF YOUR DRINKING WATER? (circle answer)

city water private well bottled water

water hauled from elsewhere other _____

HEALTH SURVEY IN THE MOLALLA AREA

DATE OF INTERVIEW: _____ INTERVIEWER INITIALS: _____
CODE NUMBER: _____
RELATIONSHIP OF PERSON ANSWERING TO SUBJECT: ____ SELF
____ SPOUSE, _____ PARENT, _____ OTHER _____

1. NAME: _____

2. ADDRESS: _____
_____

3. HOW LONG HAVE YOU LIVED AT YOUR CURRENT ADDRESS? _____
4. IF <2 YEARS, WHAT WAS YOUR PREVIOUS ADDRESS? _____

5. BIRTHDATE: ____/____/____
mo da yr

6. WHAT IS YOUR OCCUPATION? _____
7. WHERE DO YOU WORK? _____
8. HOW LONG HAVE YOU WORKED THERE? _____

9. DO YOU SMOKE? yes no
10. HOW MANY PACKS A DAY? _____
11. HOW MANY YEARS? _____
12. DO YOU CURRENTLY HAVE ANY MEDICAL PROBLEMS? yes no
IF SO, WHAT?

	Problem	Have you seen a doctor for this problem?	
13. a) _____	b)	yes	no
14. a) _____	b)	yes	no
15. a) _____	b)	yes	no
16. a) _____	b)	yes	no

17. NAME OF PHYSICIAN: _____
a) ADDRESS/PHONE: _____

18. ARE YOU CURRENTLY TAKING ANY MEDICATIONS? yes no
19. IF YES, WHICH ONES? _____
_____

HAVE YOU AT ANY TIME IN THE PAST 2 YEARS SUFFERED FROM ANY OF THE FOLLOWING?

20. Allergies? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

21. Skin problems? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

22. Recurrent infections? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr) -
    c) describe: _____
    d) have you seen a physician for this problem? yes no

23. Eye problems? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

24. Nose & throat problems? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

25. Lung problems? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

26. Heart problems? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

27. High blood pressure? yes no
    a) date begin __/__/__ (mo da yr) b) date end __/__/__ (mo da yr)
    c) describe: _____
    d) have you seen a physician for this problem? yes no

28. Stomach problems? yes no
    a) date begin __/__/__ b) date end __/__/__
       mo da yr mo da yr
    c) describe: _____
    d) have you seen a physician for this problem? yes no

29. Bowel problems? yes no
    a) date begin __/__/__ b) date end __/__/__
       mo da yr mo da yr
    c) describe: _____
    d) have you seen a physician for this problem? yes no

30. Liver problems? yes no
    a) date begin __/__/__ b) date end __/__/__
       mo da yr mo da yr
    c) describe: _____
    d) have you seen a physician for this problem? yes no

31. Kidney problems? yes no
    a) date begin __/__/__ b) date end __/__/__
       mo da yr mo da yr
    c) describe: _____
    d) have you seen a physician for this problem? yes no

32. Nervous problems? yes no
    (for ex. headache, insomnia, change in memory, difficulty concentrating, change in sensation)
    a) date begin __/__/__ b) date end __/__/__
       mo da yr mo da yr
    c) describe: _____
    d) have you seen a physician for this problem? yes no

33. Other: _____
    _____

34. DO YOU HAVE ANY ANIMALS? yes no
35. IF YES, PLEASE LIST THE KINDS OF ANIMALS AND THE NUMBER
    _____
    _____

36. HAVE ANY OF YOUR ANIMALS BEEN SICK OR DIED DURING THE PAST TWO YEARS? yes no

37. PLEASE EXPLAIN: _____
    _____

38. WHO IS YOUR VETERINARIAN? _____

THIS IS THE END OF THE SURVEY. THANK YOU FOR YOUR PARTICIPATION.
DO YOU HAVE ANY QUESTIONS?

ATTACHMENT 12

cc: EPA-X — 13124
cc: NWR-1-11-85

Please print or type with ELITE type (12 characters/inch) in the unshaded areas only.

Form Approved OMB No. 158-S79016
GSA No. 0246-EPA-OT

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

Solid Waste Division
Dept. of Environmental Quality

RECEIVED
DEC 24 1984

PLEASE PLACE LABEL IN THIS SPACE

DEQ small quantity generator.

JAN 16 1985

INSTRUCTIONS: If you received a preprinted label, affix it in the space at left. If any of the information on the label is incorrect, draw a line through it and supply the correct information in the appropriate section below. If the label is complete and correct, leave items I, II, and III below blank. If you did not receive a preprinted label, complete all items. "Installation" means a single site where hazardous waste is generated, treated, stored and/or disposed of, or a transporter's principal place of business. Please refer to the INSTRUCTIONS FOR FILING NOTIFICATION before completing this form. The information requested herein is required by law *(Section 3010 of the Resource Conservation and Recovery Act).*

DETACH

FOR OFFICIAL USE ONLY

COMMENTS: C

INSTALLATION'S EPA I.D. NUMBER	APPROVED	DATE RECEIVED (yr., mo., & day)
F ORD009045261 T/N C 1		

I. NAME OF INSTALLATION

AVISON LUMBER CO

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX: PO BOX 419

CITY OR TOWN: MCLAILA — ST.: OR — ZIP CODE: 97038

REGION: NW COUNTY: 03
PRMTS: AQ WQ SW POTW NONE
PUC: none SIC: 2421
EPA TYPE: TSD GT (NONE)
LICENSE #: none

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER: FIFTH AND LOLA ST

CITY OR TOWN: MCLAILA — ST.: OR — ZIP CODE: 97038

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title)	PHONE NO. (area code & no.)
AVISON WILLIAM VICE PRESIDENT	503-829-9131

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER: AVISON LUMBER CO

B. TYPE OF OWNERSHIP (enter the appropriate letter into box): M

F = FEDERAL
M = NON-FEDERAL

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

- [X] A. GENERATION
- [ ] B. TRANSPORTATION (complete item VII)
- [ ] C. TREAT/STORE/DISPOSE
- [ ] D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only – enter "X" in the appropriate box(es))

- [ ] A. AIR
- [ ] B. RAIL
- [ ] C. HIGHWAY
- [ ] D. WATER
- [ ] E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your Installation's EPA I.D. Number in the space provided below. D. 220 No. of employees
Also, list your number of employees (item D).

1-11-85

- [X] A. FIRST NOTIFICATION
- [ ] B. SUBSEQUENT NOTIFICATION (complete item C)

C. INSTALLATION'S EPA I.D. NO.: ORD009045261

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information.

EPA Form 8700-12 (6-80)

CONTINUE ON REVERSE

I.D. – FOR OFFICIAL USE ON.

S W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
7	8	9	10	11	12

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

X001

☐ 1. IGNITABLE (D001) ☐ 2. CORROSIVE (D002) ☐ 3. REACTIVE (D003) ☒ 4. TOXIC (D000)

X. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
B—a[illegible]	Bruce A. Thiel, Personnel	12 14 84

EPA Form 8700-12 (6-80) REVERSE

Registration with State of Oregon

To avoid duplicate registration procedures, the Oregon Department of Environmental Quality is using this EPA form 8700-12 as the means to register Oregon Hazardous Waste Generators.

I hereby agree that this application can be used for that purpose.

12 [illegible] Date: 12 14 84

HW

NATIONAL RE[illegible]NSE CENTER
OREGON ACCI[illegible]NT [illegible]

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. O R D 0 0 9 0 4 5 2 6 3 | Manifest Document No. 06794 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Avison Lumber Co, P.O. Box 419, Molalla, Ore 97038

A. State Manifest Document Number

B. State Generator's ID

4. Generator's Phone (503) 829-9131

5. Transporter 1 Company Name: Chem-Security Systems, Inc
6. US EPA ID Number: O R D 0 8 9 4 5 2 3 5 3
C. State Transporter's ID
D. Transporter's Phone 503-454-2643

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem-Security Systems, Inc.
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: ORD 089 452 353
G. State Facility's ID: 15-21-3528
H. Facility's Phone: 503-454-2643

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	EPA/State Waste No.
a. ~~NA 2020 ORM-ERQ 10/454 RQ Waste Chlorophenol Solid~~		~~7~~	~~DM~~	~~2,100~~	~~P~~	~~K-001~~
b. RQ Waste Tetrachlophenol NA2020 ORM-E 10/454		7	DM	2,100	P	K-001
c.						
d.						

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
AUG 3 1986

J. Additional Descriptions for Materials Listed Above
a.
b. E 04473 - dip tank bottoms
c.
d.

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information — Waste Profile Sheet Number(s)
a.
b.
c.
d.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name: Bruce A Thiel, Revs. | Signature | Date: Month 8 Day 6 Year 86

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: JOHN E CHILDERS | Signature | Date: Month 8 Day 6 Year 86

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month . Day . Year .

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Date: Month . Day . Year .

GENERATOR
TRANSPORTER
FACILITY

ECURITY SYSTEMS, INC

NATIONAL RESPONSE CENTER
OREGON ACCIDE RESPONSE CENTER 1-800-452-0311

(Print or type. Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2000-0404, Expires 7-31-86

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. O.R.D.0.0.9.0.4.5.2.6.1 Manifest Document No. 06795

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Avison Lumber Co. - Box 419 Molalla, OR 97038

4. Generator's Phone (503) 829-9131

A. Gross:
B. Tare:
C. Net:

5. Transporter 1 Company Name
Chem-Security Systems, Inc.

6. US EPA ID Number
O.R.D.0.8.9.4.5.2.3.5.3

D. Transporter's Phone
503 454 2643

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem-Security Systems, Inc.
Star Route
Arlington, Oregon 97812

10. US EPA ID Number
ORD 089 452 353

G. State Facility's ID

H. Facility's Phone
503-454-2643

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	EPA/I. Waste No.
a. Waste Tetrachlorophenol NA 2020 ORM-E 10/454		61	DM	18,300	P	K-001
b.						
c.						
d.						

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
DEC 11 1986

J. Additional Descriptions for Materials Listed Above
a. E 04473 - Dip Tank Bottoms
b.
c.
d.

K. WPS | Handling Code | Cu. Yd. | Area | S | D | Q | PR | Lbs. | Gal.

15. Special Handling Instructions and Additional Information **Waste Profile Sheet Number(s)**
a.
b.
c.
d.

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately decribed above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.
Unless I am a small quantity generator who has been exempted by statute or regulation from the duty to make a waste minimization certification under Section 3002(b) of RCRA, I also certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and I have selected the method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment.

Printed/Typed Name: BRUCE A. Thiel | Signature | Date: Month 12 Day 05 Year 86

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Clayton Wright | Signature | Date: Month 12 Day 05 Year 86

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.
Printed/Typed Name | Signature | Date: Month Day Year

GENERATOR
TRANSPORTER
FACILITY

EPA Form 8700-22 (9-86)

Hw

Remit and Make Checks Payable to:

Department of Environmental Quali
Attn: Fiscal Office
P.O. Box 1760
Portland, Oregon 97207

HW 7.20

FOR DEQ USE ONLY

Date Received: JUN 16 1986

Amount Received: 350.00

Bank No.: 49520

TO: AVISON LUMBER COMPANY
P.O.BOX 419
MOLALLA, OR 97038
ATTN: WILLIAM AVISON

INVOICE

Number: HW87-60

Date: 06/02/86

PERMIT NUMBER	ITEM OR REFERENCE	AMOUNT DUE	DATE DUE
	EPA ID: ORD009045261 CUBIC FEET GENERATED IN 1985: 467.80 LOCATION: FIFTH AND LOLA STREETS MOLALLA		
	HAZARDOUS WASTE GENERATOR FEE FOR JULY 1, 1986 TO JUNE 30, 1987	$350	07/01/86

NOTE: Please return pink copy of this invoice with your remittance to ensure proper credit.

DEQ 55

HW

out 1030 AM

NATIONAL RESPONSE
OREGON ACCIDENT
74340

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ORD009045261 — Manifest Document No. 06796
2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
AVISON Lumber Co.
PO Box 419 Molalla, Oregon 97038
4. Generator's Phone (503) 829-9131

A. State Manifest Document Number
B. State Generator's ID
C. State Transporter's ID
D. Transporter's Phone 503-454-2643
E. State Transporter's ID
F. Transporter's Phone
G. State Facility's ID 1524-3628
H. Facility's Phone 503-454-2643

5. Transporter 1 Company Name: Chem-Security Systems, Inc
6. US EPA ID Number: ORD089452353
7. Transporter 2 Company Name
8. US EPA ID Number

9. Designated Facility Name and Site Address
Chem-Security Systems, Inc.
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: ORD 089 452 353

GENERATOR

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	EPA/ State Waste Nos.
a.	HM NA 2020 ORM-E RQ RQ 10/4.54 Waste Chlorophenol solid	24	DM	9,600	P	K-001
b.						
c.						
d.						

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
MAY 5 1986

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
MAY 5 1986

J. Additional Descriptions for Materials Listed Above
a.
b. E04473 - Dip Tank bottoms
c.
d.

K. Handling Codes for Wastes Listed Above
WPS E04473 — CU. YD. 16.48
AREA T-10 | S. 19 | D. Q | Q. B | PR 4 | LBS 10,560 | GAL

15. Special Handling Instructions and Additional Information — Waste Profile Sheet Number(s)
a.
b.
c.
d. D-81

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name: Bruce A Thiel — Signature — Date: Month 8 Day 06 Year 85

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Clayton Wright — Signature — Date: Month 08 Day 06 Year 85

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date: Month . Day . Year .

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Barb Trullinger — Signature — Date: Month

HW

73691

NATIONAL RESPONS
OREGON ACCIDENT

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ORD009045261 | Manifest Document No. 141128 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law

3. Generator's Name and Mailing Address
AVISON Lumber Co
PO Box 419 Molalla, Ore, 97038
4. Generator's Phone (503) 829-9131

A. State Manifest Document Number
B. State Generator's ID

5. Transporter 1 Company Name: Chem-Security Systems, Inc | 6. US EPA ID Number: ORD089452353 | C. State Transporter's ID | D. Transporter's Phone 503-454-2643

7. Transporter 2 Company Name | 8. US EPA ID Number | E. State Transporter's ID | F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem-Security Systems, Inc.
Star Route
Arlington, Oregon 97812
10. US EPA ID Number: ORD 089 452 353
G. State Facility's ID
H. Facility's Phone 503-454-2643

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	EPA/I. Waste No.
a. HM NA 2020 ORM-E RQ RQ 10/4.54 Waste Chlorophenol solid	45	DM	13,500	P	K-001
b.					
c.					
d.					

Hazardous & Solid Waste Division
Dept. of Environmental Quality
RECEIVED
MAY 5 1986

J. Additional Descriptions for Materials Listed Above
a.
b. E04473 - dip Tank bottoms
c.
d.

K. Handling Codes for Wastes Listed Above
WPS E04473 | CU. FT | CU. YD. 10.8
AREA T10 | S 25 | D Q | Q FG | PR 4 | LBS 17600 | GAL

15. Special Handling Instructions and Additional Information — Waste Profile Sheet Number(s)
a.
b.
c.
d. D81

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name: Bruce A Thiel | Signature | Date: Month 6 Day 13 Year 85

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: Steven M. Webb | Signature | Date: Month 06 Day 13 Year 85

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date: Month Day Year

19. Discrepancy Indication Space
a. 5 drums rejected and returned to generator as contained free liquid.

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: NANCY A PROCTOR | Signature | Date: Month Day Year

ATTACHMENT 13

FILE: Avison Lumber

Department of Environmental Quality

Remedial Action SECTION

Phone Memo

Date: 11/4/87 Time: 2:00

Call From/To: Tara Gordon

Title: Assistant Epidemiologist

Company: State Health Division

Location: Bothell

Phone No.:

RE: Avison Lumber.

cc:

Summary of Call:

Health Division has done a study related to the Avison site. The study was performed by Michael Heumann. A copy of the study will be sent

DEQ/WQ-101-2/86

By:

FILE: Avison Lumber

Department of Environmental Quality

Remedial Action SECTION

~~Phone Memo~~ Meeting

Date: 11/6/87 Time: 9:00

Call From/To: Larry Faltetson

Title:

Company: DEQ - Water Quality

Location: Portland

Phone No.: 5374

RE: Avison Lumber

cc:

Summary of Call:

(1) Soil Removal didn't occur after 1983 study

(2) Studies concentrated on impact on Bear Creek additional groundwater sampling would be advisable - at existing wells

(3) Dioxin study - EPA and DEQ took samples jointly - EPA to do dioxin; DEQ to do other. Still awaiting validation of 2378 equivalents presented by Harry (procedures explained in EPA document "Assessing Risks Associated with Exposures to Complex Mixtures of CDDs/CDFs) Kate Snider

EPA report is not finalized - Dori Cohen should

(4) Recommends sediment sampling in creek as it passes through Avison land along drainage ditch coming from sampling sites 14 and 15 discharged into Bear Creek outside of site.

(5) Waste disposal at Avison was not documented

(6) Larry's file will be going to Rick Gates

DEQ/WQ-101-2/86

By: TB

FILE: Avison Lumber

Department of Environmental Quality

Remedial Action SECTION

Phone Memo

Date: 11/5/87 Time: 11:15

Call From/To: Jerry Patterson

Title:

Company: DEQ

Location:

Phone No.: 5374

RE: Avison Lumber

cc:

Summary of Call:

Meeting tomorrow re Avison Lumber

EPA study on dioxins at Avison.
Contact is ~~Laurie~~ Lauri Cohen in Seattle
Report should be coming - likely
recommendation is no detectable risk
by EPA but if state should decide
to do work there that sediments
near mill should be studied

DEQ/WQ-101-2/86

By: TB

FILE: Alison Lumber

Department of Environmental Quality

Remedial Action SECTION

Phone Memo

Date: 11/10/87 **Time:** 9:30

Call From/To: Michael Heumann

Title:

Company: Health Division

Location:

Phone No.: 229-5792

RE: Health Studies for Alison Lumber

cc:

Summary of Call:

(1) He is sending 2 reports

Report 1 Findings in Household Health Survey conducted in the Riddle/Tiller area May 1985

Report 2 The Study on Contaminated Wood Siding and Animal Illness June 15 1986

(2) Current Practices very good at Alison cleanest operation he has very little human contact (enclosed) and control of release to environment

(3) Murray Hocket - a graduate student at OSU obtained samples at Lumber mills around Oregon for dioxin analysis. Has published his results. Check w/ Jim Brood about publication

DEQ/WQ-101-2/86

By: D Bailey

FILE: Avison Lumber

Department of Environmental Quality

Remedial Action SECTION

Phone Memo

Date: 11/20/87 Time: 8:30

Call From/To: Leslie Perrin

Title: Industrial Hygienist

Company: APD

Location: East Portland Office

Phone No.: 257-4302

RE: Avison Lumber

cc:

Summary of Call:

APD has a large file on Avison Lumber in the East Portland office

DEQ/WQ-101-2/86

By: DB

FILE: Avison Lumber

Department of Environmental Quality

Remedial Action SECTION

~~Phone Memo~~ Meeting

Date: 11/16/87 Time: 10:30

Call From/To: Jim Broad

Title:

Company: DEQ

Location: Portland NWR

Phone No.:

RE: Avison Lumber

cc:

Summary of Call:

(1) The company removed contaminated soil from the site at the same time they put dip tank bottoms to Arlington. This was verbally communicated to DEQ. DEQ did not require written documentation

(2) The amount of waste generated before 1982 when the dip tank bottoms were cleaned out was probably small. They probably didn't clean out the dip tank bottoms until 1982 and the treatment solution was continuously reused

(3) The well found drawing from the upper aquifer was located on the opposite side of the stream from the dipping activities would be unlikely to be influenced directly by the activities and to be impacted by creek contamination

DEQ/WQ-101-2/86

By: DB